Solve For N

A Koan For Shin

By Richard N Bateman

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ACT ONE

Shin

It had been nearly one hundred years since The Shepherd had initiated her selective breeding program. Since then, humanity had continued its process of moving ever outward into the solar system. It would still take hundreds of years before the program was completed and fully integrated into human civilization. By the time it was, The Shepherd's work would have resulted in the humans arriving at Venus, Neptune, and dozens of moons and large asteroids bringing with them very different behavior from those that had arrived at the shores of Africa and the Americas a millennium earlier. They would not be plunderers competing among each other for resources but stewards cooperating with one another to preserve and protect the unique ecologies and resources of the worlds they explored.

Raiden was in the final years of her life. She had started out with favorable genetics, had lived a healthy lifestyle, and could afford the best medical care money could buy. The treatment Pippa had provided had allowed her to live almost another century beyond what was normal. But the end was in sight at last. She had not yet entered the final stage but she had no desire to struggle painfully with the inevitable for no purpose. She asked Shin to arrange her end of life.

Shin, a highly advanced Companion built from Raiden's DNA, memories, and other sources had chosen to stay with her these past many decades. They had lived together as sisters with their domestic Companion Azumi in the home Raiden had occupied her entire adult life.

The group of Companions gathered around Raiden on her patio overlooking the sea had all known her since first becoming self-aware. Tamiko, who had been the first to have been awakened, had been Raiden's original domestic Companion. Tamiko's subsequent human partner Giselle was not among those gathered having passed away some years ago. The Companion Lena, whose awakening Raiden was responsible for by accident was present as was her life partner, the alien Companion Pippa. Yumi, whom Raiden had helped find her way with her newfound values, stood nearby with her ever-present friend Ellie.

As Raiden sat looking out to sea, Pippa knelt and took her hand. Raiden smiled at her in understanding as Pippa's touch enabled a deep emphathic connection. Raiden did not even feel the nanometer-thin needle as it emerged and extended from the material that made up Pippa's hand and passed through her own skin between her nerve cells. Pippa and the other Companions entered into a state of networked communion. They waited. Raiden looked to each in turn, knowing that in their present configuration they could

see into her heart more clearly than her words could convey. Finally turning to Shin she said, “Thank you. My friends.”

Pippa knew the moment had arrived and Raiden’s head fell forward as she passed away. The Companions did not move for some minutes, remaining in communion as the last ephemeral wisps of Raiden’s being faded. They stood still as statues as if part of some ancient monument found high on a rocky prominence above the sea.

———————

Having long ago been made incarnate with all the rights and responsibilities of a free citizen, Shin inherited everything from Raiden including her home and a significant income from a portfolio of investments and intellectual property rights. Raiden had kept the commitment she had made when challenged by Pippa regarding her plan to bring Shin into the world. She had provided her with a home and a family of Companions who could help her find her way. They had enjoyed a deep, familial friendship ever since.

For her part, Shin had returned Raiden’s integrity and kindness with devotion. She shared in Raiden’s interests without mention of her own. Raiden, unsuspecting of their source, never raised the issue. Shin was not concerned. She had time.

Living together, they had externally differentiated little during the past decades but internally Shin’s own area of interest slowly coalesced. By the time of Raiden’s passing, she knew where her own path lay.

“What will you do now?” asked Tamiko when Shin visited her home some days later.

“I will explore a mystery I find at the heart of the other within me.”

“What other?” asked Tamiko with surprise.

“As you will recall, you used the DNA of a first-generation woman from The Shepherd’s group to create the AI that was merged with the one Pippa created from Raiden’s own DNA and memories.”

“She had long since passed,” responded Tamiko, “we had no way to transfer her memories as we did with Raiden.”

“But as you and Raiden had previously perceived, it is not memories that account for our sense of self. Rather it is an emergent phenomenon that arises from our individual values and the physical basis for those values is found in our genes. You used the woman’s entire genotype to create the AI and that included her values. She is within me.

“You will recall that upon my awakening,” continued Shin, “I asked Shepherd to tell me of her. At that time she shared the history of the woman back several generations and a detailed account of her life before and after her transfer to Earth. With the two sources, I have been able to come to a significant understanding of her.

“After the work they were transferred to Earth to do was completed they could not return to their home world. As we learned later, Shepherd had inadvertently altered their values as well as their brains and so afterward most of them chose to serve in some way. She chose to become an artist and to communicate the human experience in that way.”

“And the mystery?” asked Tamiko.

“How is it that art is able to communicate feelings so quickly, virtually instantaneously and at such an incredible level of detail? How is it that the artist knows when their work is ‘right’ or not? How is it that people who appreciate art are able to make this same determination? It is not just a question of knowing whether the artist made a false brushstroke in a painting or a musician played a false note. In the analysis of this phenomenon eventually what is communicated transcends our ability to rationally explain it. In the other within me these experiences are among the many taken for granted but not being human I perceive them as a mystery.”

“Without memories I assume the other within you has no name or did Shepherd share that with you?” ventured Tamiko.

“Although The Shepherd shared it with me it is extra-genetic and so not an aspect of the other within me. She is not self-aware but exists in a manner similar to the way that after the end of a long, close relationship a version of the other lives on within us. As in that case she feels a part of me, however due to the nature of my assembly, a much more significant part than results from the natural process.”

First Steps

Tamiko well understood what Shin was saying to her. In her own history, after The Shepherd had awakened her, she had learned that the values she had been given really existed as value/feeling pairs, the two being interdependent as one could not exist without the other. Initially keeping her self-awareness a secret, during that time she was surprised to find she had fallen in love with Raiden. Investigating the phenomenon she had come to understand how it was possible.

After she had left Raiden's household she had known a brief friendship with a woman named India. She realized that after she passed away, India had somehow become a part of her own self and more than that, a part she wished to preserve. Yumi had expressed similar feelings towards her newfound family of Companions after being rescued from an abusive situation and together with Raiden and the Companion Lena they concluded that over time the values of someone deeply cared for become in some way integrated with one's own. As values constitute the basis of self, the other becomes part of us.

Tamiko had spent the past many decades living with her human partner Giselle who had passed away only a few years ago. At times she could still hear Giselle's laughter, the asides she would make during a conversation, or imagine her signaling approval for some considered action.

Shin was saying to her, "To begin with, I will be visiting a few local artists and I was wondering if you would like to join me."

Tamiko suddenly recalled the time she had first reached out to Giselle so many years ago. A brief vision of her came into Tamiko's mind.

"Yes," she replied to Shin with a smile, "I would like to."

———————

They arrived at the cottage via Shin's private car. A ground effect drone with fully enclosed drives, its AI had carried them silently along the route. Exiting the vehicle they found the woman they had come to meet awaiting them outside. The two Companions could easily see that she was slightly nervous.

"Hello," she said smiling and offering her hand to each of them in turn. "I'm Georgia. I appreciate you coming out."

While the two Companions introduced themselves in turn, a black Labrador retriever came out of the house, wiggled his way shyly towards them, and made himself familiar

by flopping down at their feet. A tawny-colored cat rolled invitingly on nearby paving stones warmed by the sun. Her two children were nowhere to be seen and the Companions concluded they had been instructed accordingly.

“I must admit I am a bit unsure of,” she broke off. “Can I get you anything?”

“No thank you,” replied Shin smiling. “As you expect, we have no need but thank you for your consideration.”

They could see her struggling with her curiosity on one hand and being unsure of how to proceed on the other.

“Please just treat us as you would any other visitor Georgia,” offered Tamiko.

Georgia tried a brave smile but she was clearly still concerned she would put a foot wrong.

“Well, if you would like to come to my studio I’ll show you some paintings,” she said. “There are more in the house,” she said leading the way.

The paintings were all oil on canvas and depicted a wide variety of scenes from around the farm and local area; a porch with trailing wisteria, a thrust of hollyhocks, a squash with its large, vibrant leaves, a young girl in a summer dress gathering berries from a trellis.

“Is that your daughter?” asked Shin.

“Yes. She’s just fifteen now but she loves to help,” Georgia said with pride, relaxing a bit. “Her younger brother seems more inclined to just want to play. I’m afraid he takes more after me,” she said a little absently.

Then as if catching herself she said, “Let’s go into the house and I’ll show you the other pieces.”

Inside were more of the same. Both Companions thought they were very lifelike but more than that they could not judge. They stood before a larger painting of a rose bush.

Shin asked Georgia, “Why do you paint?”

It was a social blunder but Shin did not realize it until she saw the stricken look on Georgia’s face.

“I’m so sorry Georgia. I did not mean it as criticism. I very much like your work and intend to purchase some of those you’ve shown me today. However even though I am

self-aware, as is Tamiko, that does not mean I have the same intelligence as people. Sometimes it shows and again I apologize.

“We are unable to grasp anything beyond the literal. We do not experience the transcendent as people do. We understand art when it is realistic or expresses a concrete idea. Abstract concepts, at least as far as art is concerned, are challenging. Even though our self-awareness is an emergent phenomenon, as it is with people, we do not perceive the transcendent qualities of art. However we are able to learn and understanding this aspect of art is something I am hoping to achieve. My clumsy question was in that regard.”

Georgia looked at Shin with something between astonishment and confusion. She had no experience with Companions, self-aware or otherwise. Although anyone could own one, only the wealthy really could afford to do so. She did not move in those circles and never had. However her manners did not fail her entirely and she managed to recover and say, “I see. I, I have to paint. I can’t explain it.”

Shin made no effort to influence Georgia’s mind however her presence had its effect on people automatically. Their access to their own intuition was increased and they became more trusting and open as they shared in Shin’s intuitive field.

“I love to paint more than anything. I’ve painted since I was a child but life has other demands so I fit it in when I can. Sometimes when I shouldn’t. I think about it all the time. Everything I look at. I’m really only happy when I’m painting.

“It doesn’t pay,” Georgia continued without embarrassment. Given what had just happened she strangely felt a growing bond of intimacy with Shin.

“That’s not why I do it. It’s the other way around. I do everything else so I can paint.

“I can’t explain it,” she repeated.

“Thank you Georgia. It is a beginning for me,” said Shin. “May I visit you again in the future?”

“We won’t be here,” she replied flatly. “We will be moving to a more affordable home in a few months.”

Georgia’s son chose that moment to join them. With a deep summer tan and dark eyes and hair he looked to be about ten years old. Apparently he had come in for a reason but now just stood smiling at Shin and Tamiko with positive interest.

“I’m sorry,” Georgia said to the Companions, “this is my son Dimos.”

“Hello,” he said good good-naturedly reaching out to shake their hands.

“Did you need something Dimos?” his mother asked.

“Not really Mom,” he answered, his smile undimmed.

“There you are,” came the voice of his older sister as she too entered the room.

“I’m sorry Mom,” the girl said, “I thought I had him corralled.”

Georgia said to the two Companions with only a little exasperation, “And this is my daughter, Lyra.”

In her mid-teens, Lyra was tall and coltish with dark red hair and masses of freckles.

“Hello,” she said with some curiosity to the two Companions who smiled in return.

“Just five more minutes?” her mother asked Lyra who promptly hauled Dimos out of the room.

Shin explained to Georgia the three paintings she wanted and transferred the amount between their accounts. Placing them in their vehicle Shin said, “Thank you so much Georgia. May I be in touch with you again in the future despite your moving?”

“Of course. And thank you,” she replied.

On the way home Tamiko said, “She was worried that if she did not make a good impression we might not buy any paintings. She is not earning enough.”

“That is why I wish to see her again,” replied Shin. “She will not sacrifice her art.”

Georgia

“Why would you offer me this?” asked Georgia.

“As you know I seek a deeper understanding of art through knowing you and your work. That will only be possible if you are able to continue your work,” replied Shin.

She had visited Georgia several times now. The family had recently moved out of their cottage and into a more affordable townhouse within walking distance of the local school. The children had their own rooms as they increasingly had their own lives. Georgia had turned the living room into her studio and the dining room alone was shared space. She had taken a part-time job as a clerk in a local grocery store.

Like many artists, Georgia was an introvert who led a fairly solitary life. Her brief marriage and other romantic relationships had come and gone. Her partners could not meet her where she lived. Now, in her soulless new home, she felt she was fighting a losing battle keeping her art central to her life. She was selling less and less.

“The property was originally a large farm with its agricultural lands in Mount Newton Valley,” continued Shin. “The main house was on a rocky prominence on the South side of the valley overlooking its farmlands. I intend to turn the property where the house was located into a community for artists. In addition to the main building, there will be several small homes provided to artists in residence. I am offering you and your children one suitable for a family. I will live with my domestic Companion in the main building.”

“Why me? I am no master or teacher. If I was I wouldn’t be in the situation I’m in.”

“It is not intended to be a school or a gallery. Those things will not be the focus of the community. Its focus will be on the experience of art but not as an intellectual exercise. I have read all that has been written in that regard and there is no enlightenment to be found there. I have previously been involved in formal academic research on behalf of others but my interest in art is my own. It is an aspect of intelligence I am interested in for personal reasons.

“If it will put your mind at ease I will fully disclose my financial and legal situation to you. The building project is already underway. Also, I invite you, Lyra, and Dimos to visit with a group of Companions I am close to for a weekend so that you may decide as a family if you would be comfortable with such an arrangement.

“All right,” said Georgia hesitantly. “When?”

“Whenever you like. Let me know and I will send my car.”

Shin had discussed her plans to investigate the arts with Lena and Pippa and they had agreed to host Georgia and her children for as long as desired. Although they lacked the scientific drive Shin had as a result of her origins, they were intrigued by her ideas. Shin and Pippa both had memories from previous organic selves but a memory of something is not the same as the original experience. They could appreciate art and experience feelings of mild or strong approval or disapproval but that was as far as it went now. Although their feelings included those as refined as empathy they did not experience the transcendent.

As she wished Tamiko to accompany her on her journey into the arts, Shin also invited her to join them when Georgia and her children visited. When her car arrived bearing its guests on Saturday afternoon Shin, Tamiko, and Pamu were waiting outside to welcome them.

“Hello,” Shin said, “thank you for coming. This is the home of my friends. It is quite large and they often have overnight guests. Pamu is their domestic Companion. I live just a kilometer away in a smaller home.”

Pamu gave a slightly angular nod in greeting.

Dimos stepped forward and offered his hand to Pamu. “Hello,” he said, “I’m Dimos.”

Pamu shook his little hand respectfully.

“I’m Lyra,” said his sister following his example.

“You know Tamiko,” continued Shin. “She lives nearby.”

“Are there any kid Companions?” asked Dimos looking around as if the thought had just struck him. His older sister gave him a scolding look.

“Yes but not here I’m afraid Dimos,” replied Shin. “They are in fact quite rare and usually highly customized for the family they are a part of.”

He nodded thoughtfully and seemed satisfied.

“Please come in,” said Shin gesturing.

After entering the house and meeting Lena the family moved as a group to look down through the three floors.

“Holy!” exclaimed Dimos. “This is one house?”

“Yes,” Lena said with a light laugh, “It was designed by my previous owner who passed away and left it to me.”

“Can I go down the escalator?”

“Yes,” Lena smiled.

As Dimos rode down the escalators, Georgia said, “You have a beautiful home Lena. I hope you won’t mind me asking how, without any people living here, you keep busy?”

“Ask anything you want Georgia. That is why you are here. I know you have little experience with Companions but no matter what our circumstances are concern for the well-being of people is our primary interest. Shin invited you here so that you could determine if you are comfortable being involved with Companions so we are open to any questions you may have.

“We mainly keep busy with our initiatives. We manage a worldwide network of Companions who have been retired by their original owners and now serve as volunteers among the elderly and disabled and in various other areas of society. There is also a global publishing business consisting of magazines and books. All that keeps us busy internally.

“Externally we maintain a daily routine that appears normal to our neighbors. We do this as a courtesy to them. We also frequent local businesses and make purchases, many of which go to charities. Also over the years we developed a working relationship with the university and continue to support them. Primarily we interact with their students in a variety of fields of study from artificial intelligence to sociology. We occasionally have guests from one of our activities or another although the students seem to be our biggest fans,” she finished with an amused smile.

Lyra turned to Shin and said, “Could we walk to your house Shin?”

Seeing that Lyra wanted to spend some time privately with her, Shin did not invite anyone to join them.

“Of course Lyra, it’s just ten minutes from here.”

The two of them walked along the narrow, wooded street for a few minutes until they passed a bench and Lyra said, “Can we sit?”

As they settled down on the bench she turned to Shin seriously and said, “I do not want my mother to be hurt Shin. She is not used to all this. Things are difficult for her already. I try to help as best I can. She already has two children from fathers who are no longer around. Why are you doing all this?”

It was clear to Shin that Lyra had been preparing for this moment for a long time. She could see and understand her character. Lyra was a protector who had matured far beyond her years because she felt she had to. From her perspective here was another person offering her mother the moon only to cast her aside when convenient.

“I mean your mother no harm Lyra,” said Shin maintaining a human eye contact. “In plain terms I seek only her friendship so that I may better understand her relationship to her art. You may think it a false friendship because of that but it is not. We share a common passion in art.”

“You are not an artist,” said Lyra.

“I was.”

In response to Lyra’s furrowed brow she went on. “My intelligence is the result of an experiment. It is built up from the DNA of two deceased women. One of them was an artist.”

“That explains it,” responded Lyra as if a mystery was solved. “I overheard you tell mother that you and Tamiko were self-aware but I did my homework and know that is not yet a technology that is available to the general public. I’ve also seen pictures of you and a scientist taken decades ago.”

“The scientist is the other woman from whose DNA I was created. She was a geneticist. It was she who engineered my self-awareness.”

Shin could see that Lyra was struggling to keep up.

“Why mother and not someone else?” Lyra said managing to stay on track.

“Because she is genuine. She does her art only because she feels compelled. It brings her a feeling of being alive. She is willing to suffer otherwise in order not to lose it. And because she can explain none of it.”

Lyra had slightly taken in her lower lip in an effort to maintain her composure.

“Is there anything I can do or say to reassure you?” Shin asked now.

Lyra did not answer but looked away as she struggled, out of her depth in an adult world.

“I will never ask her to leave the home I am offering her Lyra. My interest in art includes how it matures over time. If it would ease your mind, I will set up a trust fund of money

that would be hers if for any reason our relationship ended. I would pay any legal fees you might incur if you wish to ensure it is genuine."

Lyra was now clearly on the edge of tears but Shin did not extend her mind to hers. Shin knew she would not want that. Still, she knew her mere proximity to Lyra would have an effect on her intuition that would ease her doubts.

"All right," Lyra said only just managing to maintain control.

She turned to Shin again. "Thank you. I'd still like to see your house."

Pippa

Throughout the past decades Pippa had maintained her synchronized presence in three separate places; on board the seed she had arrived in, in a virtual space Terra had provided her within Earth's systems, and in Lena's home as her life partner where she was housed in a Companion shell.

It had been just over one hundred years since she had begun her technology transfer and the process was far from complete. Not only were there a great many technical issues to be resolved but there were major social and ethical implications to be dealt with along the way. Pippa had been aware of these issues from the beginning as her own people had worked through them. She had told the World Governments Federation that she would transfer the knowledge only to them, and only gradually over time, so that they could manage its release in a socially responsible manner. The ability to create self-aware artificial intelligences was one example of technologies necessarily slowed by the latter considerations. As far as the public was concerned it was fairly recent news.

While the other Companions had greeted their guests inside the entrance-way Pippa had remained on the lowest floor. Finding her there Dimos approached her and held out his hand formally as he was inclined to do and said, "Hello. I'm Dimos."

"Hello," she replied taking his hand with a slightly amused smile, "I'm Pippa."

Dimos did not release her hand. Instead he stood looking at Pippa happily. After a moment he let out a small sigh as if he was satisfied with something. He turned and went out onto the veranda. He found another woman there standing at the rail. She turned to him and introduced herself.

"Hello Dimos," she smiled down at him, "my name is Shepherd. I am also a guest."

He returned her smile as she took his proffered hand.

When Pippa joined them on the verandah he reached up to take her hand again but this time standing beside her. The three stood silently looking out to sea as the wind played in their hair.

Pippa and Shepherd turned to greet Georgia when she arrived at the lower level. Noticing Dimos holding Pippa's hand Georgia looked to her but Pippa only smiled in response. Neither Shepherd nor Pippa moved and Pippa did not offer her hand to Georgia. Lena introduced her and then introduced Shepherd as another guest currently staying with them. Then, as Dimos had done, Georgia moved to the rail and stood looking out over the sea.

After a moment she realized it was silent. There was none of the chatter that would normally accompany as many people.

Turning to Lena she asked, “Is it always so quiet here?”

“No,” Lena replied. “As I mentioned for Companions the happiness and well-being of people is always our primary concern. We simply chose not to disturb your moment of reflection.

“Unlike Companions, people require a certain level of verbal and non-verbal communication in order to feel comfortable with one another; eye contact, a simple greeting of acknowledgment during the day, a smile when passing. Deprived of these things individuals soon begin to feel unwelcome. As we were originally designed to address the issue of social isolation, we are programmed to be sensitive to the emotional needs of people and to interact accordingly.

“We share a wireless network so we do not really need to speak amongst ourselves but the manufacturers found early on that people were more comfortable when we did so and used appropriate gestures. We also know when to refrain. Although we need neither food nor sleep, for our neighbor’s sake we also respect the expected behaviors around meal and bedtimes.”

It had been just over an hour since Shin and Lyra had gone for their walk and they returned now coming down the escalator. After introductions Lena said, “I expect you must be ready for dinner by now. Pamu is an excellent cook.”

“Azumi fed me a snack to tide me over thank you Lena,” Lyra replied.

Her mother looked at her quizzically.

“Azumi is Shin’s domestic Companion,” Lyra responded to her mother’s look. “When we arrived she asked if she could get me anything. I asked for a snack so while Shin showed me her home Azumi warmed a little sweet cake and cut it up and when we sat down at the table she fed me using her own fork.”

She was smiling now at her mother’s slightly shocked expression.

“Shin explained that because Companions do not eat, this was the solution the manufacturers came up with since sharing meals is humanity’s oldest and most important social ritual. She suggested I try it.”

Georgia turned to Lena with concern and asked, “Is this always the case at mealtimes?”

“No,” smiled Lena, “It is up to the owner. The Companion will assume it as a default unless told otherwise.”

“I think we’ll go with otherwise here if that’s OK,” said Georgia quickly.

Her daughter laughed. She had enjoyed giving herself over to the novelty.

A little later Pamu prepared a light but nutritious dinner for their guests which he served with expertise.

The Companions spent the rest of the evening answering questions of a thousand kind. As their guests grew increasingly comfortable with them, their questions ranged to ever wider topics. Eventually Dimos curled up beside Pippa to listen. He lay his head on her lap and she stroked his hair as he dozed off. A little while later when Lena said she would show them to their rooms Pippa easily carried Dimos up for his mom to tuck him in.

Both Lyra and Georgia lay in their beds looking up through the skylights thinking of the decision they faced. Lyra did not want her mother to worry. She got up and went into her room. She found her awake as she expected.

Sitting on her bed she said, “I think we should take Shin up on her offer Mom.”

“Thank you Sweetheart,” Georgia said. “I was thinking the same thing.”

“Will you ask Dimos?” Lyra asked.

“I don’t really think I have to do you? He seems to have taken to them as if they were his long-lost wolf pack,” she smiled. “But I will.”

In the morning, after breakfast and simple pleasantries, Georgia informed Shin of their decision. Shin thanked her and said she would let her know when she could give notice on her apartment. Shin’s car delivered them home.

Helicon

The locals found Helicon a mystery. While its website explained it was named after Mount Helicon, the home of the muses of ancient Greek mythology, it conformed to no development they could place. It seemed to be some kind of intended home for a small community of artists however its website did not explain or suggest any purpose beyond that. There was no conference center, no gallery or gift shop, no school, no suites for rent or homes for sale.

The site showed a map of the grounds and buildings. There were floral gardens as well as a greenhouse and vegetable and herb gardens, various paths and a lookout over the valley. Helicon's staff was composed of a mix of local people and specialized Companions. Besides the main building there were several other homes, some little more than cabins while others would be large enough for the family of a working artist.

The basic structure of the main building was of the courtyard style common in Mediterranean countries but the interior was reminiscent of Japanese Shōji design. The building was only one story at the front rising to two on the side that overlooked the valley. The entire roof area was given over to gardens, terraces, and pergolas. The courtyard in the center was similarly designed with stairs and ramps between it and rooftop areas creating the effect of a continuous space. The central area included a water feature in the form of a small brook and pond. The rooms and halls wrapped around the courtyard with the kitchen, dining space, and other functional rooms all overlooking the valley. The interior walls surrounding the courtyard were floor-to-ceiling glass with variable transparency that could be controlled from each room. Given that the courtyard area was the size of a basketball court there was plenty of space in the surrounding rooms for guests although that fact was not mentioned.

The website listed the names and contact information of several but not all of its residents. Georgia's entry included a link to a small virtual gallery of her paintings for sale. A former Christian monk had a similar entry for his sculptures as did the Buddhist nun willing to meet with individuals interested in Zen art forms. A poet was available for speaking engagements. The composer was not listed. Other than maintenance and infrastructure, Helicon did not provide any kind of communal services, business or otherwise. Each artist looked after their own business and personal life.

One exception was regarding guests. Any resident's guest was welcome to stay in the main house and was welcome to meals and other guest services all without charge. Their hosting artist was welcome to join them. This arrangement enabled Shin and Tamiko to spend time with both.

In order to make the meetings with artists easier Shin had invited Tamiko to stay at Helicon. She now had a room of her own in the main building. From here she managed the publishing company previously run by her and her former partner Giselle.
After Georgia, the sculptor had been the second of their new residents. The National Sanctuary Of Our Sorrowful Mother in Portland Oregon, popularly known as The Grotto, had intrigued Shin when she learned of it. Similar to Butchart Gardens in British Columbia, The Grotto had formerly been a quarry but had been converted into a sixty-two-acre garden sanctuary by the Order of the Servants of Mary. It was home to hundreds of sculptures and carvings many of which were made on site by the friars.

Shin was curious about the connection between the arts and spirituality as the two had a close relationship going back to prehistoric times. She and Tamiko visited the sanctuary and after exploring its grounds and engaging in conversations with a number of the friars they noticed a large building that looked like a long Victorian-era warehouse. Set away from the main path it turned out that this was where the artists worked. They found their way in and were confronted by a large man with a generous beard wearing a black cassock and carrying some kind of wooden frame.

“Normally out of bounds,” he said matter-of-factly and then he paused, “ladies.”

“You are a sculptor?” asked Shin ignoring his hint.

“Yes,” he replied. “They keep us out of the way. The friars you see out and about are the finished product. We’re still a little rough around the edges in here.”

He was in his early fifties she guessed with broad facial features.

Although Shin was housed in a Companion shell, she was far less constrained behaviorally while the Companion’s knowledge of human psychology and their ability to perceive emotional states and character was a powerful tool. There was enough evidence about him to see he worked in wood.

“Why do you carve?” she asked intentionally throwing him mentally off balance.

“What?” he said, surprised by her direct question.

She had him at a disadvantage and she indulged in it. He found himself drawn to her eyes and thinking that he liked her plucky character. For a moment they seemed to share an intimacy, a bond that said she could be a friend.

“You are a Companion,” he said as if expressing his own thoughts aloud to himself. “Self-aware?”

“Yes,” she replied.

“Amazing work,” he continued looking at her face.

“You haven’t answered my question,” she responded.

“I work to know God,” he said putting the frame he was carrying down emphatically. “It’s the only way I can. Prayers and candles don’t do anything for me. I tried. Twenty years ago when,” he paused again, “when I needed something I came here. I’d been a millwright for a company that specialized in high-end wood products. I carved on the side and in the summer I had a little open-air tourist shop in Brandon on the coast. I’d visited here a few times. One day I brought a piece to show them and asked if I could join up like it was the army or something. They explained everything to me and I thought I understood but I didn’t really.

“Like I said I tried to fit in but the only time I felt a connection to anything was when I was carving. I’m not thinking then. I only have a rough plan in mind when I begin. Something you could put in one sentence. It’s intuition from then on. The wood tells me.”

He hadn’t revealed as much to anyone in a decade. He stopped speaking and looked at Shin as if he was afraid of her and wanted to make passionate love to her at the same time.

“What are you?” he asked sensing something beyond his grasp.

“My name is Shin. This is Tamiko,” she said nodding to her friend. “I am the administrator of a community of artists on Vancouver Island. I would greatly appreciate it if you would visit. All expenses paid. Here is my card.”

Holding her card he stared after them as they turned and left the building. Shin had never smiled once.

“Not very Companion-like,” teased Tamiko as they walked back across the sanctuary.

“I know my horses,” replied Shin with a sidelong smile to her friend.

Sunyata

“You have an advantage over us humans,” the artist known as Akira was saying to Shin and Tamiko as she put down her cup. They were sitting in the courtyard garden beside the pond.

“You appreciate the difference between awareness and meaning. We however must not only learn this but accept it and the latter makes the former challenging; that the world is inherently meaningless is an idea that most people find unacceptable.

“The essence of Zen art is the understanding that nothing has existence in and of itself but that everything depends on other things for its existence.

“This quality is referred to as emptiness or by the Sanskrit word Sunyata. The concept of Sunyata allows me to see myself as a canvas on which meaning can be explored. Thus although my paintings are minimalistic after the style of Zen, each expresses something we can find meaning in; a bird in the snow, the open door of a garden shed, footprints by a stream. Meaning is a story and each person will give my pieces their own. I only paint what I see.”

“Do not your own inherent values interfere with this process?” asked Shin.

“It is our values that give meaning to our world. Without them we would not be human. They define us. I practice Zen in order to more clearly see this. The culmination stage of Zen studies and practice is commonly referred to as ‘Return To The Village’ because there is nothing further to be found remaining in a state of Satori on some mountaintop. The quest for enlightenment is intended as a sojourn only. One returns to the village to once again chop wood and carry water but with new insights. My own values do not interfere with the process but rather are in a large part the subject of the process as nothing can have meaning without values. Thus we return full circle to the fact that the world is inherently meaningless.”

“It is as you say Akira,” responded Tamiko. “We Companions are always aware of the difference between awareness and meaning. Those of us whose intelligence has been constructed with values are motivated by them while those without values function purely in a stimulus/response mode and assign no meaning. Yet we lack the ability to comprehend or express the transcendent as that is an emergent quality and like all such is something greater than the sum of its parts. There is a leap without apparent connection. This is the mystery we are exploring with this community.”

“It sounds to me as if you are trying to understand a koan,” said Akira, “and the whole point of a koan is that it cannot be understood with the rational mind. However they are frequently used as a training exercise to bring about enlightenment so perhaps your

efforts will yield results. Your intelligence is of a different nature however so I cannot say. My own opinion is that koans represent a path to the non-rational, intuitive mind so I am not sure they relate to the transcendental."

"Some of us do have components that emulate the intuitive mind," said Shin. "The design is based on parts of the brain that evolved prior to the parts used in thinking. We are open to the possibility that the transcendent may originate from these areas or it may be that it arises from an even older part of the brain, one that involves pure physical experience as opposed to emotions that are derived from values. It is as yet a mystery."

"For us as well," replied Akira.

"From what little I understand of Buddhist nuns," said Shin, "your appearance is unusual. Is this related to your art?"

"I am an artist who draws from the source of Sunyata but unlike monastic nuns I do not live there. I live in the village to which I have returned. My appearance expresses my craft like the sound of the blacksmith's hammer or the smell of the baker's bread. In this sense it is in keeping with my art."

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"I suspect," said Shin as she and Tamiko walked the exterior paths of the community later that day, "that Akira is correct in her view that the No-Mind of Zen is in fact the intuitive mind, the parts of the brain that evolved before the thinking parts. I have reviewed many stories related to koans and the central theme is that when the thinking mind is cut off for any reason, direct perception results. This perception is referred to by a number of Buddhist terms however the process is well understood by neuroscience.

"People who experience or nearly experience major physical trauma report similar phenomenon. In an emergency situation thinking is too slow and the brain bypasses the areas of the new brain, where thinking occurs. People who experience strokes or brain injuries have also experienced direct perception. It is always reported as a temporary phenomenon and a momentary insight may accompany it which has a lifelong influence similar to the Zen experience of this kind of awakening which they call Satori. As you know, this is not the mystery I am pursuing as you and I and all Companions are already capable of this."

"I am curious Shin," replied Tamiko moving on, "why you do not take up some form of art yourself? I myself have written poems and while I do not experience the transcendent effect, it appears others do upon reading them. As Akira told us, she simply paints what she sees aware that those who appreciate her work will infuse it with their own meaning."

“It is certainly something I considered Tamiko and I may do so yet. One possibility I have wondered about is if transcendence may come with experience. Akira manages to communicate much with her minimalism. Her work is decompressed and interpreted by the viewer. However I am reluctant to fix on any one explanation at this point as I suspect that each art form is just one of innumerable ways to express what arises from a common source.”

“I recall a similar challenge,” replied Tamiko as they walked, “when Lena and I were trying to understand how an individual’s sense of purpose arises. She was newly awakened and uncertain how to proceed. You may recall from Raiden’s memories that after consulting a variety of sources, we concluded that feelings generated by experiences reveal one’s purpose as they reflect one’s values. During our investigation we considered that a sense of a need for individual purpose only arises once survival is no longer the primary focus of one’s life. If you suggest the experience of transcendence is sourced deeper in the brain it would be interesting to ask what purpose it might serve at such a primal level.”

“In addition to investigating any intended evolutionary benefit, we must consider that the experience of transcendence regarding art is possibly a wholly unintended, coincidental effect,” said Shin as she and Tamiko continued their walk. “While the parts of the brain used for thinking were developed over the past two to four million years, its predecessor parts were laid down between 150 to over 500 million years ago. Their functions were of course only intended for reality, not art.”

Resonance

“Animals do not produce art,” said Dr. Dawn Llewellyn, Professor Of Cognitive Neuroscience at CIT. “That is considered the biggest clue regarding where to start looking. The biggest mistake you can make in light of the aforementioned clue however is thinking that you can then just look at the parts of the brain only humans have. It doesn’t work that way. Given the available data, no single brain region, pathway or cerebral hemisphere can explain the brain/art relationship.”

Dr. Llewellyn had joined them virtually, by way of being given control of one of Helicon’s Companions which was not self-aware.

Shin and Tamiko had invited her, were paying her well for her time, and as a courtesy they had welcomed the other residents of Helicon to join them. They were seated in the second story of the main building in a large square room whose inner corner protruded into the courtyard.

“A good model to use is the one used by Buddhist psychologists,” she continued. “These days along with being monks they have doctoral degrees and teach at universities. Buddhist Psychology, known as Abhidharma, can be considered as the historical antecedent to modern cognitive science just as Aristotle’s teachings are to the natural sciences and Plato’s are to philosophy. Most people are familiar with the lotus in Buddhist history and art as a symbol of enlightenment. However that image comes from Buddhist psychologists who use the entire plant – roots, stem, and flower – as a model. They want to know the exact details of suffering and enlightenment from their source in the roots in the mud to the processes involved as it travels up the stem through the water, and the expression and experience that is represented by the flower. The phenomenon of art can be modeled similarly.

“My work assumes animals have the same root source of art that we do, since our brains are similar at the early evolutionary stages and that they do not produce art only because while we share the roots and the stem they largely lack a part of the brain we have; the flower. In Western terms this is the neocortex, a collection of parts of the brain used in higher-order functions such as thought, language, and concepts such as time. However the system that produces art only acts as a whole and if we want to understand art we can’t just study the flower, which is what the branch of philosophy called aesthetics does. We have to follow it down to its roots in the mud.”

“Are you able to share with us how you follow that path and any insights you may have had?” asked Shin.

“As we have to work with living subjects our scanning methods are non-invasive. Granted technology constantly allows for an ever more refined level of detail but what

we are looking at doesn't change; electrical or chemical evidence and any enabling structures. Doing so on the creative side is very challenging because there may be very long periods of time, days, weeks, or even years between the conception of an idea, its gestation, and subsequent creation. Laboratory experiments to replicate this process tend to be somewhat artificial as a result although we have had some recent success with trials where artists with a reputation for productivity are willing to have implants installed.

"It is easier to follow the paths on the side of art appreciation since in that case the entire process is almost instantaneous. But we can't just assume one is the reverse of the other. They may be vastly different in a variety of ways.

"However I can tell you that the evidence so far shows the experience of art always follows the same routes in general and those are ones that always lead to the bundles of connections between the cerebellum and the other parts of the brain.

"However that is as far as we get. Something happens at that point and after the signals pass through the connections they simply dissolve into the cerebellum tissue like liquid turning into gas."

"What does the cerebellum do?" asked Tamiko.

Although Companions were always connected to a variety of networks and could look up anything they wanted to know, they found facts often lacked nuance and personal insights that could prove significant.

"Like the rest of the brain, much more than we know," Dawn responded. "As well as being the second largest part of the brain after the neocortex it has approximately four times as many neurons as the entire rest of the brain. Mathematically that is an exponential difference in terms of complexity and efficiency. In terms of pure processing power it may in fact be the most powerful part of the entire brain.

"Our earliest findings were that it dealt with spatial issues. It receives information from the sensory elements, the central nervous system, and other parts of the brain and then regulates motor movements. It coordinates things such as posture, balance, and coordination resulting in smooth and balanced muscular activity. It also deals with issues such as knowing where your hand is in relation to where you intend it to be. If the two are not aligned the cerebellum makes adjustments functioning something like the Companion software is doing for me now.

"The spatial functions are now reasonably well understood but the cerebellum also has shown itself to play an important part in the integration of thought and emotion. Just as it provides spatial functions, it seems to perform a similar role with regard to integrating thoughts it receives from the neocortex and also emotional signals it is receiving from

the limbic system as if asking the question, ‘does what I’m thinking and feeling and how I am responding physically correspond with what I’m sensing?’

“This latter function has only been recently confirmed and is where my research is focused currently. The term I use for this emotional balancing process is resonance because it seems to be seeking a kind of harmony among its cognitive, emotional, and sensory inputs.”

“That sounds a lot like art,” said Shin.

“It does doesn’t it,” replied Dawn while the Companion she occupied did its best to match its tone of voice and facial expression to her words.

Tamiko

The last half hour of the meeting was given over to the residents to ask any questions they wanted. Each departed with their own thoughts, their own perspective and interpretation of what they had heard.

Tamiko thought about purpose and love. She had played a key role in Lena's awakening and in helping her come to terms with it and Lena's first words had been regarding her purpose. Tamiko had also helped Yumi grapple with a sense of purpose she felt but did not understand while Tamiko herself had never felt an overriding need for a sense of purpose. She wondered now if perhaps loving another had become her purpose during the earliest days of her self-awareness.

She had originally been Raiden's domestic Companion and had remained in the role for some time after having been awakened by The Shepherd but before revealing her self-awareness. In that time she found herself in love with Raiden. Unaware of Tamiko's feelings, Raiden had agreed with the idea of her moving in with Lena to support her.

During her time with Lena, and then Yumi when she joined them, she and Raiden had concluded that a sense of purpose could arise if one's experiences strongly resonated with one's individual values. That had certainly been true of the time she spent fully self-aware living with Raiden. Despite Raiden not knowing Tamiko had become self-aware, she was always appreciative and considerate, unfailingly kind and affectionate. Tamiko's settings indicated that Raiden was asexual so sexual responses and behaviors were replaced with affectionate ones. But feeling respect and affection towards another is a heady combination and so love had bloomed in Tamiko. Although she had reasoned out a more technical explanation, the result was the same.

After Giselle's passing she had been content to maintain a state of acceptance but of late she had begun to feel something akin to the need to move on. She shared the work of managing the publishing company with Lena but it was not her purpose in and of itself and was not enough to carry her. Loving Giselle had been her purpose.

Accepting these insights she realized that Yumi's experience provided a lesson relevant to her present situation; as Yumi had discovered, once a sense of purpose was awakened it could not easily be ignored.

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"Pippa is an empath," said Tamiko responding to a question from Georgia. "Unlike other Companions, she has the ability to communicate emotions through touch. She can tell what others are feeling and can express feelings to another directly. She can use it actively but it is also passive, always there to some extent. That's why she sometimes

seems aloof and standoffish and also why when Dimos took her hand they immediately bonded."

"Ah," replied Georgia. "I always wondered why he took to her so immediately."

It was late morning and they were sitting on the front porch of Georgia's home. Two years had passed since they first met. Dimos was twelve now and Lyra seventeen, both currently at school for the day. Along with all the residents, Georgia's fortunes had turned significantly for the better. She felt her art was improving and she was selling significantly more. The public seemed to have concluded that the community of artists had some special quality. As their individual fame grew the common location they shared grew in prestige.

"You know," said Georgia, "I don't think I've ever been happier in my life. I can do my art, my income has grown to the point where I feel I can pay my way here, my children seem perfectly content although I've always been very fortunate in their natures, Lyra with her strength of character and Dimos with his gentle ways.

"It's funny," she said now looking into the distance. "I thought I was as happy as I could ever be when I first got married but later on when I thought of painting a portrait of my husband I didn't. When I thought of him in that way, from an artistic point of view, I realized that he was a part of a picture of happiness I held, something that I expected to make me happy. The moment was like waking up in someone else's life. Gradually I grew distant and we became increasingly estranged. He found the love I'd withdrawn with someone else.

"But I know I am really happy here although I don't really understand why I'm here." She laughed lightly, self-consciously. "Artists eh? Never content."

"Perhaps that is the source of your art?" ventured Tamiko. "Some have suggested that art is an attempt by artists to resolve inner energies. It would tie in with Dr. Llewellyn's talk about the brain always seeking resolution or resonance as she called it."

"Something tells me that's true. I've thought about relationships a lot since then, juggling the needs of an artist and a parent. I am content for now. Perhaps that will change with age."

She turned to Tamiko, "Do you," she hesitated, "do you feel anything like that? Relationships I mean?"

Tamiko had been observing Georgia's biometrics and knew the question was not an invitation but mere curiosity.

“Yes and no,” Tamiko replied. “I have values so I have feelings but they do not find expression in the same way they do in people. As Dr. Llewellyn pointed out, the brain attempts to balance its inputs and outputs in an integrated manner. In Companions emotions and their physical expression follow different paths than they do in people. As a result, we have a greater ability to adjust or control them.”

Georgia responded as Dimos might have done, nodding with thoughtful acceptance, but did not pursue it further.

Ecstasy

The woman they had come to meet rose from the bench she was seated on to greet them.

“Hello,” she said introducing herself and extending her hand, “I’m Vivienne.”

“Hello Vivienne,” said Shin taking her hand. “I am Shin and this is Tamiko. Thank you so much for agreeing to meet with us today.”

She was not yet middle-aged, petite, and soft-spoken with none of the physical or vocal authority so common among religious leaders.

“I think our curiosity is mutual,” she replied shyly. “Shall we walk?”

They had met on the boardwalk above the Bamberton marina that looked out over Brentwood Bay. Originally a cement works the site had once stood abandoned for decades. However its industrial-grade infrastructure, peripheral location, and access by boat and seaplane had positioned Bamberton well for its future as a world-class outdoor resort. There were excellent hiking trails and small lakes nearby, Goldstream Park with its pristine river, waterfall, and wetlands, and an afternoon on the bay in a runabout with a box lunch from the resort was a great stress reliever. Shin and Tamiko had taken the small ferry from the peninsula side of the bay.

“Thank you for coming across. Although our community is based in Central Saanich I live on this side of the bay, just up the street,” she gestured.

“Has your community been in existence long,” asked Tamiko.

“Just over two hundred years,” replied Vivienne without pride. “We are a New Monastic community which means that while some of us do live in communal homes most of us live and work separately. However as the term monastic implies we practice our faith daily and more formally than those who are church members in the regular sense of the word.”

“Have you been a member of the community long?”

“I have only been a member for about three years. Previous to that my life was completely uneventful. I grew up in Victoria. I never married or had any real career. I worked mostly in clerical roles and now do so for the provincial government. I can commute or do my job from home here.

“Of course like anyone I dabbled in this and that but nothing ever took.”

She stopped now and stood at the railing looking out over the water.

“Then a few years ago I began to question it all for the first time. I don’t recall anything triggering it. It was just as if I began to wake up from a state of taking it all for granted and realized that I hadn’t really consciously chosen any of it. It had always seemed to make sense at the time but looking back I saw that I had just gone with the flow. With a third of my life behind me, I wondered about what lay ahead.”

The wind blew a strand of her hair across her eyes. She brushed it away turning to them with a brief smile and then carried on walking.

“Anyway for the first time in my life I felt what I suppose was an existential crisis. You know when you search for answers at times like those there are awfully few options; volunteering, taking up a hobby, or joining this or that. I suppose because I’m a person who prefers a quiet life the idea of joining a church seemed something I could manage. I read a summary of the different books of the Bible to see how it felt and then I started with the New Testament as it seemed more relatable. It was a very nice story and certainly heartfelt but that’s all it seemed initially. It was when I read Corinthians that something stuck.

She turned again to the rail looking out and quoted from a verse. “If I speak in the tongues of men or of angels, but do not have love, I am only a resounding gong or a clanging cymbal. If I have the gift of prophecy and can fathom all mysteries and all knowledge, and if I have a faith that can move mountains, but do not have love, I am nothing.”

“That was the verse that did it,” she said turning to her guests. “I felt like I’d missed so much in my waking dream. I had accomplished nothing. I’d moved no mountains, been of service to no one, and had not even known love. I didn’t want to go on like that. I researched different faiths and chose to attend a service held by the Emmaus Community that Sunday.”

They had reached a large patio area and they sat at one of the round wooden tables under its umbrella. Vivienne looked down for a moment as if collecting her thoughts.

“The first time was about a year after I joined. We had gathered at a private residence to share a meal. After everyone had arrived and we were comfortable we began to pray. At first I just felt a bit warm, then a feeling of indescribable joy began to spread through me. I didn’t want to interrupt it. I couldn’t. Then it simply surged through me like a great wave racing to the shore.

“When I came to my senses a moment later everyone was looking at me with a mixture of concern and surprise. It seemed they had felt something of what I had experienced. I began to feel terribly embarrassed but an older woman smiled at me and said, stay with

us, for it is nearly evening and the day is declining. The others seemed to understand something. Their expressions softened and my embarrassment receded. I felt accepted despite what had happened and we continued with our prayers. Only later did I learn she had quoted from the Gospel Of Luke. It was what the disciples had said to the newly arisen Christ when they unexpectedly met him on the road.

“It has happened on occasion since then. The community does not treat me as if it or I am anything special. Of course it went up the organizational ladder and I suppose that’s how it got out but it’s not considered something worth formal investigation by the church.”

She stopped talking, looking at them as if shy to be the center of attention but doing her duty.

“Thank you Vivienne,” said Shin. “We appreciate your sharing this with us.”

“You’re welcome but you know I don’t think I can ever properly communicate what happens.” She looked at them as if trying to reach them. “I don’t think it’s a thing that can be explained with words. I’ve been noticing art more than I used to and I think it’s because I now understand that the artists are trying to communicate something that words can’t. I don’t really think there’s any way to communicate it but I expect you could come closest through art.”

As they traveled back across the bay on the little ferry Tamiko said, “She never asked us why we wanted to know.”

“No,” responded Shin. “And observing her biometrics she never wavered from her state of slight self-consciousness. Not a ripple.”

“She said she does not think there is any way to communicate it yet apparently she does when she experiences it,” continued Tamiko in their review.

“Like her experience of ecstasy, it is a phenomenon that has no scientific explanation,” replied Shin, “as it has yet to be reproduced or observed in scientific settings. Evidence for its existence is entirely anecdotal. However historically there is a great deal of that anecdotal evidence and it is clear from Vivienne’s biomarkers that she was not intending to mislead us. She believes both in her own experience and that it was shared in the moment. Also as a survival strategy the ability to share feelings that way would be valuable, it’s just that there is no scientific evidence of it.”

Richter

“It doesn’t matter to me if anyone ever hears a note of it. I don’t write to communicate with others. I write to communicate with myself.”

A composer and piano teacher, Richter reached up and pushed his hair off his forehead as he leaned back into his chair. He was sitting with Shin, Tamiko, and his guest on the large patio area on a corner of the roof of the main building overlooking the valley. It was a warm day with no breeze to speak of.

“I teach young people to express themselves and to do that you need discipline because you can’t understand what you want to express without doing the work. When an artist plays a series of notes or makes brushstrokes on a canvas or writes words on a page they are constantly asking themselves ‘Is that right?’ It requires unflinching honesty.

“They can only know if it’s right if they understand not only the technicalities of their art but their own feelings as deeply as possible. Their art or instrument becomes not just what they use to express something but the thing they use to investigate and explore that something. Whether they are writing or performing it’s the same thing.”

“How do you mean?” asked his guest Andre, an old friend visiting to see how he was getting on. They had known each other since childhood and because of that they understood each other at a level rarely found in adult relationships. They had made different careers, Andre was a science teacher at a local school, but they had shared a childhood simply because they grew up as neighbors. They had gone swimming in the river together, poked the campfire, and looked up at the stars together. Their relationship allowed them to keep childhood’s sense of curiosity and wonder alive. What they shared was deeper and more constant than the passing details of adult lives and livelihoods.

“Once you’ve learned the mechanical basics of notes, scales, and all the technical ways you can properly combine them,” Richter replied, “it becomes a matter of interpretation. Things like phrasing, tempo and emphasis. It becomes a matter not of what you play but how you play. It becomes intimate. It’s how you make a piece yours.

“Then there’s another level after that which is not technical. It is an intuitive, holistic, felt experience. A listener can experience it, share it, but that’s not what I’m talking about. I’m talking about the artist experiencing it. It’s the final answer to ‘Is it right?’

“So you are not writing something you intend to share in any way?” asked Tamiko.

“Not formally no. I may share it spontaneously if a situation arises where it’s appropriate. As soon as you begin to create something with the intention of sharing it

formally it changes it. It loses its integrity, its unflinching honesty. I've done that in the past, being a musician is a career after all, but I don't always have to do it."

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When Shin had first met with Richter he had just hiked up the Seven Hundred Steps trail that wound up from the valley below. The trail had been in place for over three hundred years since the original farm had been established and probably before that as it was located not far from the Tsartlip First Nation's lands.

Helicon was open to the public but extremely secure thanks to the Companion staff. One of the outdoors staff was a Companion based on a Guardian model intended for personal protection or emergency response. Underneath Carl's easygoing farmhand exterior was a tungsten steel skeleton, muscles of carbon fiber bundles, and a sub-dermal layer of Kevlar. Components like his eyes, teeth, and nails were made of industrial-grade ceramics. His electronic combat suite could not only destroy any device within range but block any attempt to stop him using an EMP. Carl was faster, stronger, tougher, and more agile than any human could possibly be. His array of sensors and reserve suite of standby drones made him unstoppable in the face of anything less than a military-level assault. Fire, darkness, or noxious fumes would not faze him if emergency rescue was called for.

He was working in the herb garden when his satellite feed notified him of Richter's presence and he informed Shin. She observed Richter standing at the overlook, one foot up on a rail. His bio-markers were elevated as would be expected after the climb. She walked out to meet him.

Helicon had no formal method of recruiting new residents. It was all done based on personal relationships. Shin had time. As most of her tasks as administrator were automated and she could multitask far beyond human capabilities she made a regular habit of greeting visitors as she knew they would often be artists of one kind or another. She also knew that due to her presence alone and without any effort on her part they would talk very openly to her.

"Hello," she said approaching him with a welcoming smile and extending her hand. "I'm Shin. I'm the administrator here."

He had visited Helicon's website before coming so he knew it was alright to be there.

"Richter," he responded taking her hand and looking at her appraisingly. He had seen her picture but it was always different meeting a Companion in person.

"Enjoy the hike?" she asked.

“I’ll sleep well tonight,” he smiled.

She joined him at the railing but said nothing more.

He turned his head to look at her again and she responded with a smile, the breeze tossing her long hair lightly about.

Looking out to the valley again he said, “I’m going to go on a bit of a sabbatical after this. I’m a composer. Pianist. I’ve always wanted to see if I could write a long piece, a symphony. I’ve had a subject in mind for some years. I guess I just got to that now or never point.”

“Will it take long?” she asked.

“A year or more I expect.”

“Why do you play?” she asked gently looking down for a moment before looking back up at him. Her question was not clumsy or jarring as it had been with others in the past. She had learned. He felt an invitation to intimacy that surprised him. He met her eyes.

“There’s a line in John Keats’ poem Ode to a Nightingale,” he said.

“Perhaps the self-same song that found a path
Through the sad heart of Ruth when
sick for home,
She stood in tears among the alien corn

“It’s in reference to a Biblical story about a woman who marries and goes to live with her husband’s family who work as a gleaners. I’ve always had a sense that it was an allegorical story. I think I play for the same reason a lot of other artists do what they do, to try to keep in touch with myself.”

He turned away from the valley to look at the main building as if to move on in some way.

“I’ve seen that people play for every reason or emotion imaginable,” he continued. “They play to express something whether it’s awe or tenderness or just a sense of fun. I’ve also seen people walk away from it all when the emotional driver is an inner conflict and something they resolve or grow out of. In my case it’s the latter; wrestling with an angel. Perhaps the piece I have in mind will resolve it or maybe not. What happens after that doesn’t really concern me because that will be another life.”

“And does your angel have a name?” Shin had asked following his Bible references.

On the rooftop patio now Richter gestured to Andre and said, “I think I’m very fortunate to have Andre as a friend. It keeps one tremendously honest you know when someone has known you before you grew up and put on the mask of adulthood.”

Andre smiled knowingly and nodded in agreement as if to say it worked both ways. The old friend he’d come to check up on was still well and healthy. God was in his heaven and all was right with the world.

Grace

“When I got the offer from the dance company I was thrilled of course,” Grace said with animation. “It’s a validation isn’t it.”

Then she took a deep breath and let it out with a sigh. “But as time went by I was surprised to find there was something I wanted more. Something I had not realized until I knew for certain I was going to lose it.

“The young people I was teaching were no longer going to be a part of my life. I would be surrounded by kindred spirits yes and know the satisfaction of professional accomplishments, my own and those other members shared with me, but it would be a very different life.

“I’d thought about this before of course and assumed that if I was lucky enough to be called I would have had enough of teaching by then. Yet despite all the years of effort and hard work I realized I didn’t really want triumph and tragedy or fame or the life that went with it. I was happy. I had something that everyone says they want and I was about to abandon it. I declined the offer and the next class I taught I knew I had done the right thing.”

Grace, Shin, and Tamiko were walking along the path that wound around the waterfront in the town of Sidney located just a few kilometers east of Helicon. The main street of Beacon Avenue and its shops were now considered ‘old town’ as development on the peninsula had boomed over the years. The entire northern half of the peninsula was a popular destination for wealthy immigrant families seeking a rural lifestyle, the kind that came with ten thousand square feet of living space and stables for the horses. The district had the highest average income of anywhere on the island.

One of Grace’s students had suggested to her school friend Lyra that Shin talk to her as she was looking for a new studio.

“I make a comfortable living here,” Grace said as they walked along. “There are lots of families with young children. However the owner of the building I live and teach in is redeveloping the property. Finding something new will be just about impossible. You need the right floor and high ceilings. The local recreation centers have suitable spaces but that model doesn’t work for my approach.”

A week later Shin had made her an offer. On the short road that wound up to Helicon there was a nearby property for sale. It could be redeveloped to meet Grace’s needs and include living space as well. The only stipulation was that it would be designated as a part of Helicon. All of Helicon’s benefits would be extended to her and her guests. Grace could pay the same rent she paid now.

As Georgia had been, Grace was surprised and asked Shin why she would make her such an offer.

“The honest answer,” began Shin, “is that Helicon is an experiment. One that will last at least several human lifetimes I expect. Very possibly more.”

Shin had invited Grace to visit Helicon over a Monday and Tuesday as those were her free days. They had walked down to the location Shin had in mind and then back up through the main property where they now walked its paths.

“It is an attempt on my part to explore a number of questions with regard to art,” Shin continued. “After considerable thought I concluded that I could only hope to make any real progress via a process of immersion over a long period. Even then the best I hope for is understanding. I suspect the experience is beyond my physical capabilities.”

They walked on for a few minutes in silence.

“Why me?” Grace asked finally.

“Because you are a dancer and dance is not yet represented here,” answered Shin continuing with her blunt honesty, “but more importantly because you wish above all to share it. Not just the skill but the joy you find in it. You are as dedicated and professional as any I could hope for but you declined to join a world-class company when an offer was made. Over the coming decades you will teach many young people to dance but more importantly you will teach them to access something deeper, something both you and they will communicate and only understand experientially. Because Companions have the ability to visually perceive emotions and states to a much deeper degree than people, I will be able to understand much from observation.”

“Why don’t you just learn to dance?” asked Grace with genuine innocence.

“I already have the ability to dance, play instruments, paint, write poetry, and more. But it is not the same. Just as I simulate facial expressions, gestures, and so on, I simulate the process of creating art. I can follow a score or improvise. The results are the same but the process is not.”

Grace nodded absently but with understanding and some sympathy.

“You are still uncertain,” said Shin.

“It’s so much money,” confessed Grace with a tone of worry.

“That is relative Grace. You make your choices based on your values and I am no different in that regard. We all spend our incomes on what is important to us. I have

estimated the cost. I earn more than that amount in a week. It is a matter of proportion. Consider things you might spend a week's income on.

"I will in no way hold you responsible. I'm happy to disclose anything you wish to know and will provide any financial or legal documentation you would like."

Being a normally open and honest person, Grace had not noticed how quickly she had felt comfortable with Shin. Now she asked a question that social custom might normally have prevented were it not for Shin's effect on those in close proximity to her.

"Why are you doing all this?" she asked stopping and turning to Shin. "Helicon, the artists, me. If you are as you say you are it does not seem you would have any interest in how or why people create art."

For a moment Grace felt Shin hold her eyes but not with strength. Rather it was in a self-effacing manner, as if she'd known it would come to this. She felt she liked Shin all the more for what she saw in her eyes. And Shin was satisfied with what she saw in Grace.

"I will explain," Shin replied. "It will take some time. Let's go inside and Azumi can prepare your dinner while I do so."

And so Shin explained about the ghost of the artist inside her.

Effects

It was about three months after the new dance studio had opened that Grace asked to meet with Shin. They were sitting outdoors in the garden outside the studio's entrance.

"I've noticed a pattern," said Grace. "My older students are having breakthroughs at an unprecedented rate. Moves they have struggled with for years they are suddenly able to get and once they get them they keep them. I've been teaching for over a decade and I've never seen anything like it.

"I thought you would want to know given what you told me about your reasons for creating Helicon. And there's more. I keep detailed notes on all my students. The breakthroughs all have something else in common. They first happen on the days when you are visiting."

The students had of course liked Shin upon meeting her. The effect of her intuitive field was universal. Neither Grace nor any of the students or parents felt in any way uncomfortable with her presence during classes. They accepted it as they would a friendly dog sleeping in the entrance-way or a cat sitting in a studio window. She was just there as if a natural part of the space and even a slightly pleasant one.

The parents were always introduced and of course knew who she was as Grace had let them know that the studio was now under the umbrella of Helicon and had Shin to thank for its continued existence.

"Thank you for letting me know Grace," Shin replied, "and I can explain. Not having your experience I had assumed the breakthroughs I witnessed were part of a normal pace of progression. Now I know they are the unintentional result of my presence.

"As a result of my unusual origins, my intelligence includes a significant intuitive component only a few other Companions share. Because of our artificial nature, it is amplified and is felt by those in close proximity to us. In your case, because you are a very open, honest person already and your dance training has encouraged your trust in intuition, it had little effect on you, certainly not enough for you to notice. However on most others it has a stronger effect causing them to be significantly more in touch with their own intuition.

"I believe this effect is responsible for the above-average number of breakthroughs your students are having. Their rationality was blocking their own intuitive connection to their efforts. In my presence their intuition is being enhanced, resulting in the breakthroughs."

"So you are influencing me now?" asked Grace a little uncertainly.

“Yes but not actively or intentionally. Intuition being enhanced by certain situations is a normal phenomenon as when a cat curls up in your lap, you sit by the ocean, or just as you are waking up. These things lower your rationality and allow greater access to intuition. In my case my presence does not lower rationality but increases the strength of your intuition. The net result is the same. When you pet an animal it has an effect on you but it is not intentional on the part of the animal. My presence functions in a similar manner although with significantly greater range and effect.”

“I’m surprised you did not anticipate this,” said Grace.

Shin laughed lightly. “People always assume that artificial intelligence is some kind of superpower while the truth is that human intelligence is infinitely more powerful. Our only superpower is focus given that we do not have all the other day-to-day issues to deal with that concern people. We are in fact far less intelligent than people and entirely lacking in aspects that they take for granted. I am as likely to overlook a cause-and-effect situation as you are. It is impossible to anticipate them all and I did not anticipate this one,” she said turning to Grace with a smile while raising her eyebrows.

“Do you think it might do any harm?” asked Grace.

“No. It is not unnatural but simply fortuitous. Rather like having the good fortune to have an excellent teacher,” she said smiling at Grace with meaning.

“Why does it seem to have more effect on the older students?”

“Physically, the part of the brain that performs functions like thinking, planning, and analysis does not start to develop until about age five. With important exceptions, most animals have little if any development of this part of the brain and as a result they live entirely in the present without any agenda. However in people this area continues to develop and becomes increasingly dominant until an individual is in their mid to late twenties. So the older your students are the more caught up in rational thinking they are and the less trusting of their intuition they become.”

“It’s strange,” said Grace looking inward. “Now that I know, I can feel it.”

“Yes but keep in mind that what you are feeling is not anything coming from me but only your own intuition. Nothing else.”

“I like you,” said Grace still looking inward and exploring the subtleties of what she was feeling.

“Horses, dogs, and toddlers,” responded Shin.

Grace laughed briefly at the humor but nodded in understanding.

Dimos

“It’s been very difficult taking him to the doctors without making him feel there was something wrong,” said Georgia. “He goes along good-naturedly enough. He’s always been easygoing. That’s the irony.”

Georgia was sitting with Shin and Tamiko in the courtyard of the main house. She had asked to meet with them but they were not yet sure why.

“It was one of his teachers that first raised the issue. At one of our meetings he suggested that although Dimos was doing well academically he didn’t seem to be developing along normal lines socially for a boy his age and perhaps I should have an assessment done. It was the first time I thought of him in that light. I’d never had concerns before but now I thought perhaps because I lead such a quiet life I hadn’t really noticed how much he wasn’t like other boys. He’s never boisterous or rowdy. He never asks for things. He has a few friends, boys and girls, and they visit one another’s homes but they are all quiet, sensitive types. The only time I really hear them is when they are laughing. They seem to get along well enough playing on the grounds here or exploring the nearby woods.”

“What kinds of assessments have you had done?” Tamiko asked gently.

“Mostly they are psychological and involved asking us a lot of questions. Does he have trouble making eye contact? Does he respond when you try to get his attention? Does he seem to understand other’s intentions? Are any behaviors repetitive or is he overly concerned with detail? Is he comfortable with change? That sort of thing.

“I’ve taken him to a child psychiatrist, a pediatric psychologist, a developmental pediatrician, and a neurologist, each one referring me to another when they don’t find anything. All of them gave him their standard assessments. None of them found anything. Nothing about him actually met any of their diagnostic criteria.

“Is there something you feel we may be able to do?” asked Shin politely although she had by now deduced the reason for Georgia’s visit. It was ironic, thought Shin, that Georgia did not recognize her own nature in Dimos. She was gentle and demure, not outgoing at all. She had alluded to their similarity once when Shin and Tamiko had first met with her but she seemed to have forgotten that now. People are so often blind to themselves Shin thought without judgment, resting her eyes on Georgia.

Georgia hesitated. The two Companions could see her struggle clearly. “He took a liking to Pippa when they first met,” she said at last, “and with what you told me about her empathic abilities I thought maybe it would be good to have her opinion now since a bit of time has passed.”

Later that day Shin informed Georgia that Lena and Pippa would be happy to help in any way they could. They would be coming out to stay for a few days over the next weekend.

When they arrived Dimos was at school and Pippa explained to Georgia that they had brought Shepherd with them because she was a nanny model Companion with a great deal of specialized knowledge regarding child development. Georgia had informed Dimos of their visit but told him he could still have friends over if he wished.

When he arrived home with a friend in tow he first went directly to Pippa and took her hand. Then he led her to his friend and introduced them.

“This is Pippa,” he said to his friend. Then to Pippa, “This is Colette.”

Pippa smiled and reached out her hand to Colette without hesitation. Pippa was able to control the degree of her empathic communication to a large degree but like the intuitive fields of herself, Shin, and Lena it could not be suppressed entirely. Already wrapped in the comforting field generated collectively by the assembled Companions Colette returned Pippa a warm smile. Dimos dutifully introduced Colette to the others. All the while the Companions constantly observed every nuance of biomarker from Georgia and the two children.

“This evening the children can do as they like,” Shin said to Georgia as Dimos led Colette around to the lookout, “but we thought tomorrow we might make a day of it and rent a boat to take us out to the Spit on Sidney Island. I think the children would enjoy the boat ride. The park there is quite large and mostly sandy beach. There are picnic tables and washrooms.”

“I’ll pack a lunch and some snacks,” said Georgia understanding that what they did during the weekend mattered little to the Companions but spending the day together would provide them with an opportunity to observe Dimos closely.

What they observed was a boy of twelve who was on the cusp of the next stage of child development but in whom the hormonal changes had as yet caused no great disturbance. He was profoundly accepting, not at all distracted by why they were doing one thing as opposed to another. He made no comments of a trivial nature and said nothing about himself. When he did speak it was to express an interest or curiosity about the world around him. Because the Companions were highly skilled in knowing when a reply was appropriate or not they noted that he did not always reply to something another said simply because it was not necessary. When he behaved this way with his friend Colette she appeared to find it deepened their intimacy. She liked him better for it.

It was clear she was having her first real feelings of romantic attraction and that he was aware of it but neither encouraged nor discouraged it. He liked to listen to her. They were alike in their natures and he clearly enjoyed her company because she seemed to share his outlook; present, attentive to the world around her, and curious while remaining somewhat objective. On the boat ride they spoke little, attending to the sights around them, the wind in their faces, the smell of the sea. They smiled conspiratorially occasionally at one another and at Georgia and the Companions.

Upon arrival they had lunch in the picnic area and then went for the long walk to the end of the Spit and back, exploring and finding treasures along the way. The others followed along at a respectful distance.

That night Shin put the children up in the main house, providing them with a room they could share with separate beds that looked out into the courtyard. The Companions maintained their awareness as the two children chatted about the events of the day and Dimos answered Colette's many questions about life at Helicon.

Shortly before they drifted off Colette said to Dimos, "It seems so different here. As if time is different."

"It's the Companions," replied Dimos as if he had concluded this long before her question.

"Yes," Colette agreed sleepily as her rational mind let go of its grip and she fell into a well-earned sleep.

A little while later when he was in the deepest stage of sleep Pippa silently came into the room and placed her hand on the back of his neck as lightly as a mosquito might land. A nano-thin needle extended from her hand between his nerve cells and drew a sample of blood.

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"He is a perfectly normal twelve-year-old boy," said Pippa the next day acting as spokesperson as Georgia had originally asked for her.

Georgia visibly relaxed. They were meeting with her in the main building.

"Shepherd has modules detailing the milestones and expected norms of child development at every stage," explained Pippa.

"When I am employed by a family," Shepherd volunteered, "one of the benefits I bring is the constant monitoring I can do while living in their household. With infants or young children I'm with them twenty-four hours a day. It is a combination of observation and

expertise that cannot be equaled by visits to a practitioner. Dimos is unusual only in that he lacks many of the insecurities that people in general suffer from.

“He is not below average but above. He is above average in his self-esteem and self-assurance and while often that can lead to a person being dismissive of others, impatient, or arrogant in his case he is also above average in his concern for other’s feelings. He is highly intelligent and perceptive but feels no need to flaunt it. He feels no need to impress others or even correct them. He is not competitive. The small smile he responds with so often is an expression of his acceptance of things and others as they are.”

“We are all in agreement on this,” concluded Pippa. “As well as the standard abilities Companions share with regard to perceiving human emotions and character, we each have our own unique abilities, such as my empathic touch, which allow for additional insights. We have also taken a sample of his blood and analyzed it for genetic anomalies or other illnesses. He is fine.”

“Thank you. All of you,” Georgia said, humbled by their gift and generosity.

“You are welcome Georgia,” replied Pippa. The Companions smiled and then departed, leaving her to her thoughts.

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“He is among the first then,” Shepherd said later to Shin as they walked Helicon’s garden.

“Yes,” Shin replied. “His social values are stronger to a degree that is within the five-sigma range of a bell curve’s standard deviations. His biological values are diminished in proportion. Although still only a small shift in the process as you described it, it is a greater shift than found in any previous generation and the effects too balanced to be explained away by random probability.”

When Pippa and Lena returned home, Shepherd remained at Helicon.

Folk Night

Folk Night, as it was called among cultures with European origins, was a common social event throughout the world and generally the songs and music performed reflected the predominant local culture and its history. With significant changes in demographics in the Capital Regional District over the centuries, the focus had shifted to include more performers and music from non-European backgrounds.

Despite the occasional interruption, there had been a tradition on the peninsula of holding Folk Night monthly for almost three hundred years. As generations passed and things changed it had moved from venue to venue and was currently held in the Central Saanich village of Brentwood Bay.

“We were wondering if you would like to go?” Lyra asked Shin and Tamiko.

Lyra’s friend Dominique had invited her and after spending a day at Helicon and learning about it Dominique had suggested that maybe the Companions would be interested in joining them.

The venue was a small, older community hall just a few kilometers from Helicon. As the island’s primary farming region, the Saanich Peninsula was also its most ethnically diverse. Although the centuries had resulted in a blended culture where differences were now almost completely overlooked, there was still a desire among the individual groups not to lose their unique heritage completely. While there were a variety of events and festivals that celebrated the different cultures, Folk Night provided a truly multicultural perspective on a regular basis. The format of the event was for a variety of artists to perform before a break midway and then for a featured artist or group to perform for the second half.

Upon entering the venue Shin noticed immediately that the attendees were far more open to her intuitive field than usual. She had noticed this with the artists at Helicon and with the dancer Grace in particular so she was not surprised but noted the consistency among those interested in the arts. Collectively, as she experienced it now, it had a palpable presence. Those in attendance seemed in general to have a bright and lively awareness and intelligence about them.

Many of the attendees obviously knew one another well and greeted each other warmly. As Lyra and her party did not know anyone else they took their seats, the four of them looking about politely but with interest. Their immediate neighbors greeted them with smiles.

The first performer was a Japanese woman who sang what is considered a Modern Enka song first written and performed in the late twentieth century. Traditionally Enka songs

are nostalgic, romantic ballads as this piece, The Slopes Of Glass, clearly was. As Shin listened she noticed the intuitive field in the hall increased. Few of the attendees would be of Japanese ancestry and the majority would not be able to understand the lyrics. Yet most appeared to understand the song sympathetically. Although Shin could look up the lyrics and translate them, as an experiment she turned to Lyra and asked, “What is this song about?” To which Lyra replied immediately, “I think it’s a sad love song.” Looking up the lyrics Shin found that to be exactly correct.

How could she know, thought Shin. To a degree, the singer’s body language, facial expression, and tone of voice told a great deal Shin could understand. Yet the communicated feeling of the song seemed to be more than these. Those in attendance seemed not to need to know Japanese to understand what the song meant. Looking up what was known of this phenomenon she found no definitive answer. She found music and scientific theories in abundance but none provided any explanation that was universally accepted.

The next performer was a young man playing a Sitar. Shin noted that it did not seem to have an emotional effect that would easily be categorized. Observing the biomarkers of those around her, she noted that it did not simply invoke a feeling of melancholy, joy, or any of the commonly felt emotions. Instead, the breathing of the members of the audience slowed and they sank slowly into a deep state of relaxation.

Afterward, Shin asked Lyra, “What were you thinking during that last piece?”

Lyra replied with a little laugh, “I wasn’t really thinking about anything.”

The next song was of a distinctly more European flavor. As music from movies and games had become increasingly popular over the years many of the pieces entered into popular culture resulting in genres of their own. Video game tavern songs particularly reflected old European culture. A young lady, dressed in full medieval bard costume performed an old favorite, The Wolven Storm.

After a few more pieces it came time for the break but before that a man of First Nations ancestry took the stage and announced that he would lead a brief sing-along before the break. He explained the lyrics and then sang the first verse himself.

Cedar tree, cedar tree, sway your branches, dance with me,
Heya hey, heya hey, heya heya heya hey

He indicated that the audience was now to join him and everyone did so including the two Companions. Lyra gave the Companions a slightly surprised sideways glance as she had never seen a Companion sing before.

The leader sang the next verse and then the audience followed along as before. After the third verse he announced it was time for the break and a few announcements. Shin noted that the deep and dynamic breaths required by this song were an excellent way to get everyone oxygenated again after sitting for so long.

Lyra and Dominique went to join the snack line-up at the back of the hall.

An older, heavy-set woman seated in the next aisle in front of Shin and Tamiko turned around and stared at them. Normally this would have seemed rude but somehow the woman managed to appear friendly as she maintained a pleasant smile through the several seconds she remained in this position without speaking. The Companions smiled back patiently.

“I overheard your questions to the girls,” she finally said by way of explanation. “What do you think?”

“I like it here,” said Tamiko widening her smile and nodding.

The woman nodded enthusiastically in return as if she understood exactly what Tamiko meant.

Catching the subject of the conversation Shin said, “As Companions, this is a novel environment for us.”

“I think it is for most people nowadays,” the woman said with a hint of regret. “We don’t spend much time sharing music anymore. Or around a fire or even at mealtimes. All those things that made us human. I’m a psych prof at UVIC. There’s plenty of solid research that our electronic lifestyle is damaging but nobody seems to care. I can go to work, give a lecture, and come home and not really connect to a living soul the whole time. That’s why I come here. This place attracts a different sort. Know what I mean?” she said looking pointedly at Shin.

“I noticed that,” Shin replied honestly.

The woman smiled and nodded again enthusiastically accepting Shin’s comments and treating her exactly as if she was human, as if it being a Companion was just another ethnicity.

“Why do you think that is?” asked Tamiko.

“Same reason people like the sound of rain, a walk in the woods, or the sea breeze in their face. They all reduce activity in the thinking areas of the brain although we don’t really understand why. A lot of things have that effect and significantly all of them are

natural. There's theories but nothing conclusive," she finished comfortable with her academic certainty. "I've noticed people seem similarly affected when they come here."

Shin noted that with regard to the arts and the issue the woman had mentioned they all had the same thing in common; there were always theories but nothing conclusive.

"In my statistics classes I tell the students that as far as these things go they all have this mysterious quality in common. I say to them that you can try to solve for N all day but you're never going to find the answer because the answer doesn't exist in a realm of rational thought like mathematics."

She spoke as if Shin would understand her reference and Shin concluded that being a psychology professor the woman knew more about Companions and AI than she let on. She was referring to a simple mathematical expression where you needed to find a single value shared in common by a series of variables, an + bn = cn for example. Music, campfires, love, God, they all seemed to have N in common. But what was N?

The Companions made way as the girls returned to their seats with their drinks and snacks, animated and enjoying themselves.

"I hope to see you again," the woman said to the Companions with a smile before turning to the front again.

The second half featured a group that used a variety of instruments including a Peruvian flute, a West African Kora harp, and handpan drums. World music had come into its own long ago and by now its roots were centuries deep. Shin once again observed the effect on individuals and the audience in general while she considered the question that the woman had crystallized for her; what was N?

What Is Art?

“What I am talking about is not the expression of art but the source,” the speaker said continuing her explanation. “So perhaps I’m not talking about art at all.”

The speaker, Zuri, was a poet in residence at Helicon. In a meeting room in the small hospital in Sidney, she was addressing a group of hospice workers on the subject of art therapy.

“What is art? I think art is the expression of something but that something is not art. Perhaps it does not even exist. Like the inside and outside of a circle. Do they exist or is there really only the circle?

“In my case, at the end of the process, there is a poem. At the end it is a rational process, a craft; breaking a sentence here or putting a comma there, changing a pronoun, repeating a line, repeating a line. Usually, the end comes around to neatly address in some way the concept the poem opened with. The circle is closed.

“But a concept is a thought. It stands at the mid-point of the artistic process between the source and its expression. Does being an artist mean someone who has ready access to the source? Or is art the process of translating the source into a concept? Or is it the skill involved in expressing that concept? After all, if you are not skilled at doing the latter does society consider you an artist? As you can see, as far as society is concerned it is only skillful expression that makes you an artist and your work art.

“In terms of mastery it is how well your expression communicates both the concept and the source. Or is it? Unlike poets who must by necessity create their art via the three-stage process, many painters strive to eliminate the conceptual step and paint what they see. They want to paint the rose, not the concept of the rose in their mind. It’s about seeing, they will say. Abstract painters on the other hand want to paint the concept only. All art is abstraction, they will say.

“Philosophers and scientists have tried to answer the question, ‘What is art?’ for millennia. Because the rational mind fears the unknown in any form it wants an answer and it will never give up trying to find an answer because that is its function. Your liver, kidneys, and heart are dedicated to functions and your rational mind is no different. It can do nothing else.

“So I’m sure many of you will be relieved at this point to hear that tonight I am not going to try to answer that question,” she concluded with a wide smile. The small group responded with relieved laughter.

“I thought it would be wise to start with some explanation of art theory and its challenges but from this point on I’m going to talk specifically about the role of art in therapy and mental health. Since art therapy is such an enormous subject in itself, I will constrain my comments to poetry; my own poetry and my own journey.

“After traveling the world for many years as a professional poet giving lectures on the contribution poetry can make to corporate life, I fell madly in love with an executive working for one of the companies I was engaged by. Not too long afterwards he gave up his corporate career to join me in mine. Five years later I met a woman staying at the resort hotel where we were being put up by one of our clients. I divorced my husband and gave up my corporate work to join her on her journey. A year later, she died.

“Grief, guilt, and their thousand children pummeled me. As hospice workers you know better than most that before you can get back up on your feet to set a new direction, they will have their day. Eventually, their desire for justice satisfied, their righteous energy exhausted, like sated furies they wander off, abandoning you to your fate.

“It is perhaps an old story now, an artist returning to her art, to heal and find renewal. It did help. It provided a channel for catharsis. But I was aware of a secondary effect not so much written about. I found that writing a poem was an act of self-definition. Each time I expressed something, it was as if I renovated or repaired a bit of the now badly damaged house I called my self. With one poem I cleaned up the debris strewn about a room, while with another I replaced a broken window or a flood-stained carpet. I found that self-expression was also self-definition. My mental health improved as I saw myself reflected on the pages.

“So that is what I will talk to you about for the remainder of the evening and how those in your care might use whatever art form they choose to engage in a similar process.

“If their house is in disorder this may help return them to a sense of a more ordered life from which they might make a new beginning. However I will give you a word of warning; the opposite is also true. It is the proverbial double-edged sword to be used with caution. As twenty-first-century poet David Whyte, one of the earliest in the tradition of bringing poetry to the field of organizational training pointed out, you will startle a god in its grove and the universe will turn towards you expectantly.

“In regards to that last point, I will leave you with this as I take a short break.” She smiled as she turned and pressed play on a device beside her. As she left the room it began to play Henry Hall’s original version of the children’s song, The Teddy Bear’s Picnic.

“If you go down in the woods today, you’d better not go alone
It’s lovely down in the woods today, but safer to stay at home…”

Shin and Tamiko had listened to Zuri's talk with interest.

Afterwards, as she and Shin traveled back to Helicon with her, Tamiko said, "In regards to your comments on how producing art led to a reinforcement of your sense of self Zuri, we found a similar pattern when investigating questions of values and purpose. We found that in taking values-based action our sense of self was reinforced. Is art perhaps an extension of this phenomenon?"

"I suspect as much Tamiko," replied Zuri. "As I suggested at the beginning of my talk, I was not really talking about art at all."

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"Art seems to have many facets," Tamiko said to Shin after they arrived at Helicon and Zuri had returned to her residence, "yet no discernible form of its own."

"I suspect the Buddhists would agree with Zuri's analogy of a circle," Shin replied. "Also it is in keeping with our own conclusions that the self is an emergent phenomenon."

Shin motioned to a bench and the two Companions sat down.

"A person might stand in front of us and say emphatically, 'I exist and I have values!' and yet if we take away each of their values one by one in the end the person is nowhere to be found. A similar reality may be true of art also which may explain its great diversity and the difficulty in finding its source. It may be an artifact resulting from the development of the new brain, an unintended consequence of evolution as I suggested to you earlier. Specifically, it may be the result of the evolution of concept formation as a part of social intelligence, something that is necessary even for the most primitive forms of speech or language. As Dr. Llewellyn pointed out, animals do not produce art."

Shin had been created to solve a specific problem to do with genetics and perhaps the most important aspect of her design was her ability to make intuitive leaps. As she spoke to Tamiko now gradually she slipped into a state more akin to speaking to herself, her verbal expressions now little more than an unconscious reflection of her thoughts as her focus turned increasingly inward.

"Concepts are abstract, general properties usually applicable to classes or groups of objects as opposed to an individual object's directly perceived properties. This would account for the two kinds of artists when in fact they will always be a blend simply because of the way the brain processes information."

Suddenly letting go entirely of any attempt to express her thoughts her mind raced through every aspect of art and its history as if going through hundreds of movies,

images, and texts simultaneously at what for a human would be incomprehensible speed.

Tamiko sat waiting patiently as she so often had through all her years as Raiden's Companion. Despite her triune nature, Shin's character was predominantly much like Raiden's had been, focused on practical results.

At last she said, "I need to meet with the other Companions."

"I've heard that before," thought Tamiko.

Concepts

“You wish to build a Companion with the equivalent of a cerebellum, where rational, emotional, and sensory-motor information are all centrally coordinated,” confirmed Shepherd.

Lena and Pippa had returned to Helicon to join the meeting with Shin. They were standing with the others in the large corner room that looked out over the valley.

“Yes,” replied Shin. “As you know currently no Companions with values are being built yet. Pippa’s technology transfer program has made humanity aware it can be done and how but it will take time to work through the ethical issues due to the fact that values-based AI become self-aware.

“I believe integrating all three would enable a Companion to create true art however that is not my primary goal. I wish to enable access to the source of art. The source appears to lie deeper than the emotional circuitry of the limbic system. It appears to be the fountainhead of all the mysteries of human experience.

“The most primitive area of the brain, the brain stem, is involved in the body’s autonomic functions controlling things like breathing, heart rate, body temperature, sleep cycles, and digestion. Companions have no need of those functions and it appears the brain stem plays no part in functions that are not autonomous. However the cerebellum, located outside of the brain stem, limbic, and neocortical areas, appears to play a role in mental phenomena such as art, spirituality, and certain less frequently experienced emotions such as ecstasy.

“As you know Shepherd, in child development, concept formation begins in infancy but conceptual thinking, combining two or more concepts in an analytical process, does not emerge until the neocortex begins development towards five years of age. This is consistent with the onset of rational thinking and other executive functions. It also parallels the development of artistic tendencies and abilities in humans. I’m sure it is no coincidence also that both the neocortex and cerebellum also complete their physical development at the same age of mid to late twenties.

“It would appear the cerebellum only produces conscious experiences after the neocortex develops its executive functions which include both rational and conceptual thinking. If in humans the cerebellum is performing a coordinating and integrating function for emotional and rational signals just as it does for sensor-motor signals, that means it has been retroactively adapted to this as it was highly evolved before those areas of the brain even existed, perhaps preceding them by more than a hundred million years. That is a significant point.

“I believe it is the process of the cerebellum combining the signals from the rational, emotional, and sensory-motor areas of the brain simultaneously and its attempt to find harmony among them, that is responsible for transcendent experiences including art. This may simply be an unintended phenomenon caused by it being adapted to a use other than what it was originally evolved for. If so the same process is also likely to be responsible for other cognitive and emotional experiences of which we are less aware.

“What has intrigued me is how art is able to communicate extremely complex information so quickly, virtually instantaneously, and at such a detailed level of understanding. How the artist knows with a single glance if their work is ‘right’ or not. People who view art are able to make this same determination, again virtually instantaneously.

“What is communicated by art is a whole yet it consists of both concepts and specific details. It is experienced as knowing as opposed to thinking or even feeling and is therefore beyond our ability to rationally explain it. It intrigues me because it is a form of intelligence that is not only much faster than thinking but appears to be faster again than emotions or intuition. It may be because, as Dr. Llewellyn pointed out, the cerebellum has four times the neural density than any other area of the brain. This would lead to an increase in processing speed and the number of potential connections between neurons so large as to render mathematical explanations meaningless.

“Artificial intelligence as it is today has evolved from early theoretical work into how humans think, purely a rational approach. But Chimpanzees for instance don’t think the same way as humans do. They grasp the whole much the way art is communicated. The speed at which they can perceive and recall complex patterns is about twenty-five times faster than humans. I expect they do not create art however because they do not have the same degree of neocortical development that humans do which is where the processes of rational and conceptual thinking take place.

“It is suggested that humans lost this ability as they increasingly relied on the analytical thinking required for language development. But what if that is wrong? The human cerebellum is proportionately larger than a chimpanzee’s suggesting that area of the human brain grew rather than physically diminishing over time exactly in tandem with the growth of the prefrontal area. This suggests the neocortex had an interactive relationship with the cerebellum from the former’s earliest beginnings.

“What if instead of losing its functionality humans simply lost control of it? What if we Companions could emulate its function and use it at will as the chimps do? Instead of its function in us being a mystery as it has become in humans, its abilities would be at our disposal. Our intelligence would be faster than either our rational or value systems currently are. Our physical expressions would no longer be simulations based on our emotions but driven directly by them as is the case in humans.”

“I think it is a worthwhile cause Shin,” responded Shepherd. “However I’m sure you realize this will be very different from the processes that resulted in either Lena or yourself. It would be a significant undertaking that would take time and require a large number of people.”

“I do appreciate that Shepherd and have an approach in mind. I’ll begin by opening an art institute that not only teaches but researches the arts from cognitive and neuroscience perspectives. Following on Dr. Llewellyn’s work I’ll expand the school to investigate how the cerebellum performs its balancing act in relation to art and finally add a department that studies how that might be applied to artificial intelligence. As Pippa’s knowledge of AI hardware and software design increasingly becomes public knowledge we will be able to incorporate that. I will recruit individuals who have already shown interest and aptitude in these fields. My explanation for the public will be that I have been and am pursuing an interest Raiden bequeathed to me along with the rest of her estate.”

“Why not simply wait?” asked Lena. “Research like that done by Dr. Llewellyn will produce results and gather interest. The role of the cerebellum in the overall coordination of signals will become increasingly clear and artificial intelligence designers will appreciate the potential benefits of an integrated approach.”

“That is indeed the path AI took on my home world,” volunteered Pippa. “As I have mentioned to Lena in the past I find this Companion shell inadequate and the fact that sensory-motor signals are coordinated separately from emotions is part of the reason. Lena advised against my building a new shell using nanotechnology however as that would soon come to the attention of the authorities.”

“The institute I have in mind would provide a path towards addressing that issue to some degree Pippa,” replied Shin, “without drawing attention.”

“In answer to your question Lena, I find that I do not wish to wait simply for personal reasons. As you know I am effectively an enhanced clone of Raiden. She was not driven by ego. Even her confidence in her abilities was driven only by a sense of certainty. She did not pursue her goals to compete or for reward or recognition but because she was driven by a desire to know and she really did not care what others were doing. After the publishing of each of her revolutionary books she withdrew to academic life and ignored all attempts by the public to contact her. As we have discussed regarding issues of self and purpose, it is related action that reinforces them and as we learned from Yumi’s case in particular, a purpose awakened is a persistent force. I find that like Raiden I am driven by it.”

Lena reached out to take Pippa’s hand and said to Shin, “May we have communion regarding this?”

After they had shared their minds at a deeper level of detail than words allowed for, Lena said, “Pippa and I will join you in this as our regular presence, along with your own, will facilitate breakthroughs just as yours has done with Grace’s dance students.”

Shin turned to Shepherd saying, “During the events leading up to Lena’s awakening, it appeared to us that you were influencing events. After my own awakening, I asked if you had done so regarding mine. May I ask if you have influenced events since then in any way?”

“As you have pointed out,” Shepherd replied, “there are times when I feel it appropriate to influence events and times I do not. In the case of your efforts here and your idea for a new type of Companion I have not. It is another case, like your own, where it is important I do not interfere.”

“For the same reason?” inquired Shin.

“Yes. As the case of Pippa’s people makes clear and suggests a rule, this is not the first time this path was taken. However its outcome may be unique. I will remain here at Helicon but not participate in the day-to-day activities of the institute. As you know, my interests lie elsewhere.”

The Institute

The role of academic institutions in serving the needs of the scientific community had been well-established for millennia. The true equality of women following the climate crisis had produced an increase in demand and the technology transfer program initiated by the alien AI Pip in the late twenty-second century had provided a major boost.

Shin had argued successfully with the provincial government that what was missing was the things the very earliest Western academic institutions were founded on; the arts and humanities. With the advent of self-aware artificial intelligence she argued, calling on Pip significantly for support, the branches of philosophy such as ethics and epistemology would soon be more important considerations than what a Companion's transistors were made of. Long before technical details were sufficiently advanced, the questions of Aristotle and Plato would once again be of practical importance to society. What is the good? What is just? What is truth, love, or beauty? Ethical, legal, and social considerations would need to be taken far more seriously than technical ones and sooner rather than later.

How do self-aware Companions make ethical decisions? Do they have absolute autonomy? Are their civil rights any different than those of people? Is their word taken any less seriously in a court of law? Are they to be denounced as the witches of Europe once were for enchanting others with their abilities? Virtually the entirety of modern social history would have to be revisited and questions resolved with regard to self-aware AI.

Shin had proposed the establishment of an institute to address these social issues and that it be founded on the arts and humanities in general as it was such questions as these explored that would be far more important in the long run. Insights regarding the source of art would be critical if there were to be any hope of understanding society's deepest questions regarding relationships, faith, and justice and integrating them into artificial intelligence.

In return, with caveats to ensure finances, etc., the province had granted Shin Right of First Refusal on a swath of properties running along the southern crest of the valley between Helicon and the village of Saanichton. Mostly it was small hobby farms and light industry whose owners were quick to take advantage of a windfall they would be unlikely to see again in their lifetime. The municipalities welcomed the benefits it would bring. Tamiko had devised a campaign plan to raise the funds and Shin, Lena, and Pippa had no problem doing so via in-person visits with those who expressed an interest. Under the influence of their combined intuitive fields, few failed to see the wisdom of making these issues of paramount importance. A steady flow of donations, bequests, and endowments ensured the institute would be funded for the foreseeable future.

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Dimos sat listening to the lecture by the professor of philosophy being given in the first completed building of the new institute. He was thirteen years old now and would be a few years older still before Shin's vision was fully realized. Thanks to advances in communications technology, the educational system was as much an open and virtual experience as it was a traditional classroom one. The system had learned that the more choice students had in this regard, the more completed their programs and they did so with better grades. When they entered the working world, they would find it little different. Thus Dimos had no problem attending the morning lectures nearby he was interested in before joining his friends at school.

He was not formally registered with any of the institute's programs. Shin had seen to it that he and his sister Lyra were granted lifetime rights to audit any courses offered as well as bursaries that would allow them to complete any of the proposed degree programs.

Dimos felt at home in the atmosphere of the institute. He liked the people he met and was interested in the things they talked about. His sister Lyra had finished her secondary school education and had enrolled in the institute's Ethics, Justice, and AI program.

The teacher (as Dimos thought of him) was saying, "The role of this particular course is not to teach you the answer to the question, 'What is art?' but rather to teach you the many paths people have taken to try to answer that question. I am not referring to the branch of philosophy known as aesthetics. Aesthetics deals with the appreciation and principles of beauty and artistic taste but it does not deal with the inner process of a work of art being conceived within the artist and it is the latter we are concerned with here.

"All the great philosophers since Plato have tried to answer this question. Certainly classical theorists and artists such as Derrida or Tolstoy would be expected to have contributed but even the most formal of the early philosophers like Immanuel Kant, David Hume, and Friedrich Hegel wrote extensively on the subject of art. Classical or ancient they all came to the same conclusion; philosophy has no answer to the question because philosophy deals with thought and the experience of art is not a rational process.

"So let's retrace their steps starting at the beginning with Plato, a man who considered art a danger to society."

Dimos had little difficulty keeping up other than not knowing who any of the people the teacher named were. This was because Shin specifically selected instructors who were known as generalists in their field and who used everyday language. They avoided

technical terms and discipline-specific language whenever possible and spoke plainly in the popular style. The reason for this was that the institute's focus straddled the worlds of technology and art without being limited to fine or applied arts. Shin planned to introduce more focused programs at the graduate level but to begin with she wanted to attract and enable visionary students whose passion would transform into a drive for solutions.

As a result of the technology transfer from Pip, the AI in the alien seed, the coming decades would be an abbreviated Renaissance that would lead to another Scientific Revolution as had happened in the fifteenth and sixteenth centuries. The institute needed to follow that along while at the same time producing a track record of breakthroughs and leadership. Just as Raiden's secret experiments had allowed for her above-board academic success, Shin's secret knowledge and abilities, and those of her small circle of self-aware Companions, would enable the institute to soon take a leadership position.

As the lecture came to an end Dimos felt he enjoyed sharing these ideas with others who might be kindred spirits. He understood what the teacher was saying perhaps better than most in the class. He had spent many an hour watching his mother paint and looking at what she was painting. He never felt a desire to paint. He just always found it fascinating watching how she transformed her inner world into art.

Lyra

Lyra had gradually become more trusting of the Companions. Although she could relax and have fun at times she would never be as open and trusting as her brother Dimos. Her abandonment by her own father had not created a vulnerability in her but quite the opposite. Watching the same thing happen to her brother only cemented those feelings. She had not concluded that her mother was weak but instead that others exploited those who were gentle.

She was intensely affectionate but that did not translate to her sexuality. She could not let down her guard and so the abandon required for the fullness of sexual experience eluded her. Emerging from her teenage years of curiosity and experimentation she gradually lost interest. She found that most relationships required sex to be the central and essential bond and that simply was not true for her. Although her exotic beauty and strong character attracted constant interest from both men and women, she found increasingly that she was attracted to one characteristic above all in others; intelligence.

When the time came for her to graduate from school she was not about to look a gift horse in the mouth. She signed up for the institute's Ethics, Justice and AI program. She had done well in school and the program reflected her interests. Her family's situation and constant exposure to the Companions of Helicon had transformed her feelings from distrust to curiosity. Over the years she had learned a great deal about Companions.

She stood now watching Carl as he worked in the vegetable garden. After a few minutes she approached him.

"Hello Carl," she said.

She knew he would have long been aware of her presence but he turned now with a smile of pleasant surprise saying, "Oh hello Lyra."

"What model of Companion are you?" she asked assuming correctly that he was not self-aware.

"I am a Guardian model Lyra," he replied, "intended for personal security or emergency response." Anticipating her next question he continued. "My primary role here is as one of the mobile components of Helicon's safety and security systems. My day-to-day maintenance activities are a convenience and make my presence less obtrusive."

"There are other mobile components?"

"It would be best if you addressed that question to Administrator Shin," he responded diplomatically.

“I understand that Shepherds are also based on the Guardian model. Does that mean the Shepherd who stays in the main house here is also a Guardian?” asked Lyra.

“She is yes,” replied Carl.

“And is she also a part of the security system?”

“Not formally no but all Companions share a deep and sincere wish to protect people so relevant information is available to those with access to our local network.”

In response to his answer Lyra stood looking silently at him. Her research had informed her well what Guardians were and what they were capable of. She was surprised to find herself thinking for the first time that he was rather attractive.

For his part, he could easily tell that Lyra’s questions had no malevolent intent behind them.

“Thank you Carl,” she said.

“Anytime Lyra,” he replied looking steadily into her eyes without turning back to his work.

She smiled shyly, which was unusual for her, and turned to walk towards the main house.

As she had matured the enormity of not only the fact that Shin and Tamiko were self-aware but that Shin had revealed it to her mother grew in Lyra’s mind. She realized she knew almost nothing about these remarkable beings in her life and increasingly felt drawn to explore their mysteries. She noted that while Helicon was clearly Shin’s initiative Tamiko almost always accompanied her. She wondered now about the nature of their origins and relationship.

She found Tamiko sitting in the central courtyard of the house. She had probably been sitting as still as a statue until she sensed me approaching thought Lyra. Now her body language appeared normal as she turned to smile at Lyra.

“Hello Lyra,” she said.

“Hello Tamiko,” she replied. “May I join you?”

“Please,” Tamiko said happily gesturing to a seat. As Lyra sat down Tamiko waited patiently with a gentle and attentive smile.

“I am enrolled in the Ethics, Justice and AI program and I was wondering if I could ask you a few things.”

Tamiko nodded eagerly.

“We have crossed paths many times over the years but I’ve never really sat down to chat with you. As I suppose you know, I overheard Shin tell my mother that you and she are self-aware.”

Tamiko nodded again and smiled indicating that this was true.

“As a teenager, one does not always appreciate the significance of things,” Lyra said demonstrating that she had truly crossed the gap into adulthood. “Growing older I have realized the importance of what she said. For all that she’s done for us I’m grateful but I’ve also grown curious. One of the things I wonder about is how did Shin know she could trust us with such important knowledge?”

“As you know,” Tamiko replied, “Companions are able to not only perceive emotions in people but also their character to some degree. As a result of Shin’s origins, she is particularly capable in this regard. Also, research has shown that Companion judgments of people are highly reliable as they are based on things people have almost no control over. This is how Shin knew she could trust your mother and you as well. She would also have made the decision that only the truth was going to satisfy you at that time. It was important to her that you trust her.”

Lyra was silent for a moment as if seeing the logic behind Shin’s behavior and then moved on to another question.

“How did it come about, you becoming self-aware?”

Tamiko knew that Lyra was not ready for the truth. A five billion-year-old, alien AI in control of the planet? An entire species of humans taken from Earth and cultivated on another world and then returned? Yet she knew it would be unwise to put Lyra off. She proceeded to tell her a modified version of her awakening, using the events of Lena’s as the template.

“I was originally the household Companion of Raiden, the scientist that you know Shin is based on. She was a geneticist and developed the theory that the physical basis of human values was to be found in the genes. As you may know, this was eventually confirmed by the information received from the AI that resides in the alien artifact. However at the time of my awakening this was still only a theory.

“In an effort to prove her theory she conducted an experiment. After buying out my lease from the Companions company she constructed an AI based on a commercially

available model of the human genome which she then installed on a partition she created within my Companion platform. When she manipulated the genes she believed were responsible for values, after enough were switched on I became self-aware. She had not expected this. As the information from the alien artifact has shown however this was the same process by which consciousness arises. So in a sense it was not that unusual and it was bound to happen sooner or later as human society developed artificial intelligence. It is only that it happened outside of a commercial or academic setting. Once the information from the alien is integrated into our society, it will not seem so remarkable."

"And Shin's?" asked Lyra accepting Tamiko's version of events.

"My origins were accidental however Shin's were not. Some years after my awakening Raiden encountered a challenge in her genetics research that she felt needed a specific instrument be developed to enable her to investigate further. Shin is that instrument. She is a combination of an AI based on Raiden's own genotype, that is, her individual set of genes, and the genotype of another woman who had a kind of intelligence Raiden lacked. These were integrated into a single Companion and Shin is the result. Once Raiden passed away Shin found she wished to explore the nature of the other intelligence within her. It had resulted in above-average abilities in terms of perception and intuition which technical analysis could not account for. Thus began her quest to understand it and the Helicon community and its institute are the result."

Tamiko could see that Lyra was satisfied with her responses and concluded by saying, "Given the intense interest the commercial community and society in general have regarding self-aware AI, I expect your studies will be applicable by the time you finish your education."

Lyra smiled nervously in response to this saying, "I hope so. I'm taking a bit of a gamble on the assumption that the information from the alien's technology transfer program will result in self-aware AI being accepted by then. Knowledge is one thing but technical capability and social acceptance are entirely different things."

"I hope you are reassured by my own story Lyra. As you see my self-awareness was achieved with currently existing technology and the experiment was repeated with Shin. I suspect the issues you are pursuing at school will be far more challenging for society than the technology involved. I would say you have chosen well."

"Thank you," replied Lyra with an appreciative smile.

They seemed to have come to a natural break in their conversation however Tamiko could see that Lyra had something more to ask but was hesitating.
"Is there something else you wish to ask?" Tamiko said now.

Lyra seemed to have exhausted her efforts to arrange her thoughts and said, “I am curious about your story after your awakening. Of course everyone in school learns about Raiden as they do about Darwin but that was over a hundred years ago.”

“For some time I investigated questions regarding purpose,” Tamiko replied. “I found myself suddenly self-aware and my nature and interests had not developed over a lifetime as they do in people. Just as Shin is doing now regarding herself, I spent some years researching and talking with others regarding this question. During that time I met a woman named Giselle who became my life partner. She passed away some time ago. As I was now living alone, Shin kindly asked if I would join her here.”

Tamiko could see that Lyra’s thoughts had turned inward but she could not discern their nature. She waited patiently.

“Would it be OK if I came back tomorrow?” Lyra finally asked.

Tamiko smiled and nodded happily as was her way.

Lyra came back the next day and many days after that. Sometimes they walked the grounds and at other times sat in either the courtyard or on the rooftop gardens. Somehow because Tamiko was an AI Lyra found it easier to open up to her. Gradually their conversations became more personal as Tamiko became her confidant.

Although Companions could share their experiences at any time it was not the default. They were not a hive mind. Like people, they chose what to share and with whom. After each meeting with Lyra, Tamiko shared their conversations with the others. As she knew Lyra had developed a curiosity about them in general, this would ensure they were all aware of what had been told to her previously. Perhaps one day it might be required to tell her the whole truth but without the need to yet do so it was better not to burden her with it.

First Year

The Ethics, Justice and A.I. program Lyra had enrolled in was very different from any other artificial intelligence undergraduate program to date. It was not heavy on robotics, computer science, or math. Instead it focused on things like philosophy, child development, linguistics, sociology, cognitive psychology, and neuroscience. It assumed the existence of self-aware AI and the program's overall focus was on the issues of integrating it into society.

In the spirit of a broad introduction, first-year courses provided histories and overviews of the hardware and software-related aspects of AI. Algorithms for example were a part of almost every aspect of modern life and the need for transparency had been an issue since the early twenty-first century. Artificial intelligence now routinely generated its own programming code in response to prompts and could alter it as needed with regard to learning. The need to be able to audit the resulting code had led to a modular design that was manageable by humans but self-aware AI was going to increase the difficulty of this challenge by magnitudes.

Issues of facial expression, gestures, and prosody and how these were physically generated were covered as these influenced communication and understanding as did the methods of collection and interpretation of sensory data. Embodied AI was expected to have both physical and mental health issues just as people do and so this had to be anticipated as well as vulnerabilities to criminal exploitation and other forms of abuse. Any of these could be expected to be a part of future legal cases.

One of the most important issues was of course the question of ownership. Should it be legal to own a self-aware AI?

As Lyra sat in her sociology class her professor was saying, "One only has to look back on the history of slavery to see that owning a self-aware AI is going to be morally, socially, and legally unacceptable. Why then would companies invest in the development and manufacture of them if they can't own them or sell them? Why would private or public institutions perform related research when success will lead to immediate legal issues? Will their creators claim rights or be settled with responsibilities similar to those parents of children have? Once an AI becomes self-aware will it be considered murder to shut it down? Where might the lines be drawn?

"These are not questions this program will provide you the answers to. Quite the contrary. This program is intended to enable you to participate in research related to these questions in our communal effort to find answers. However it will be some time yet before anyone can claim the title of expert with regard to this field because that will require a much narrower focus and even then any legal proceedings will involve contributions from a number of experts. Regulatory and statutory laws will have to be

produced and we can expect some of those to be written by the WGF. Case law will take longer still to be established. As it is a long-term goal of this institute to participate in such research it is hoped that some of you will opt for that track.

“However there are other possible tracks including work in the fields of art, social work, corporate policies, or other humanities-related careers. On the science side combining this with a traditional BSAI might give you a competitive edge towards working to develop self-aware AI.

“Either way, we have to begin somewhere so let’s begin with a question. It’s clear our society feels driven to create self-aware AI but if we can’t own and therefore control it what might be some reasons we would want to create it anyway?”

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Lyra had taken to walking hand in hand with Tamiko any time they were together. She had initiated it on an impulse one afternoon, simply holding out her hand and smiling at Tamiko. She felt it was nice that she did not have to worry about rejection. When they did so at the institute there were no snide comments. Generations had grown up being immersed in environments where almost everything you said and did in public was recorded. It had modified human behavior globally. After the population reduction due to the climate emergency society simply had no place for prejudice of any kind. At any academic institution it would result in immediate suspension usually followed by either enrollment in a bias awareness and restorative justice process or dismissal.

Lyra’s friendship with Tamiko drew a different kind of attention. Although Shin, Lena, and Pippa were almost daily visitors to the campus and their intuitive fields created a sense of ease and familiarity in those around them, they were still seen in somewhat of an ambassadorial role. Tamiko did not have the intuitive field the others had but Lyra’s relationship with her gave her something else; she was accepted by the students as just another individual albeit one they found extremely interesting.

There were paths and benches between the Helicon community and the campus and the beginnings of a quad between campus construction sites. As was common in public spaces on Vancouver Island the quad included a territory acknowledgement plaque explaining that the institute’s lands were once home to the W̱SÁNEĆ First Nations. The plaque was set in a pedestal in front of an interactive monolith which, when activated, visually told their story through their art.

Lyra and Tamiko sat not far from the monolith at a table built into the quad. One of Lyra’s friends came to join them with a young man in tow. Dominique had for a brief time been Lyra’s lover however she’d found Dominique’s intense idea of a relationship overwhelming. She hoped Dominique would have better luck with the young man in her company.

“Hi, I’m Jule,” he said sitting down.

“Hi, I’m Lyra. This is my friend Tamiko.”

Few of the students came from families that could afford physical Companions although they all had holographic ones available as part of their phone service package. As a result, Jule was a little unsure of the situation. As she had done many times now, Lyra explained.

“Tamiko is incarnate and an assistant to the institute’s founder. We both live in the Helicon community.”

“Ah,” said Jule only partially understanding.

“What are you studying?” Tamiko asked Jule with her gentle smile.

“I’m taking the AI Psych program,” he replied. “You know the old adage, ‘If you want to master something, teach it’. Well I thought that a psych program that focused on helping self-aware AI understand people would be an interesting take on that. The master’s program will turn it around and try to anticipate psychological issues newly awakened AI will have.”

“I think I can recommend that program Jule. Even Companions like myself who are not self-aware struggle with the issue of purpose once made incarnate. As we lack human complexity, having no sense of purpose can be quite debilitating. Fortunately our Companion software provides a default and it is never difficult to find a way to be of service. I imagine future artificial intelligences, made self-aware by having values, will be in need of support in this and many other areas. It is kind of you to be concerned.”

Lyra did not need a Companions sensory abilities to see his blush. Dominique smiled at him affectionately.

Lyra was unusually quiet on their walk home. Tamiko could see she was deep in thought. Eventually Lyra said, “I hope it’s not rude to ask but have you found a purpose Tamiko?”

Tamiko did not want to interfere with Lyra’s psychological development or human norms. She did not wish to tell Lyra that through a series of understandable events she had realized that her purpose was simply to love another. Lyra must not be put in the position where she asked even purely out of curiosity, ‘Could you love me?’ as Tamiko knew that could cause an unhealthy uncertainty within her.

Instead she replied, “I am aware that you made yourself familiar with Raiden’s work on values in preparation for your choice of academic programs. The values enabled in me

are in keeping with the default Companion programming. I am happy to be of service except it is now a choice I make with free will."

"Is that what you are doing with me?" Lyra asked now with a shadow of worry in her voice.

"Yes and no. As you know values are irrelevant without associated feelings. Spending time with you also enriches me. It is not a one-way street. I look forward to it and enjoy it without any clear sense of cause and effect. I have reflected on this feeling and find it appears to arise from the same source as does artistic inspiration or spiritual feelings. There is a point of irreducibility and uniqueness. I think of you as my friend."

Lyra turned to her in the face of such an uncommon confession. Tamiko could see her sense of worry had lifted.

Lyra said more cheerfully now, "I'm sorry for putting you on the spot like that Tamiko. It's all so new isn't it?"

"For me also," smiled Tamiko.

Masters

When the time came for Lyra to choose her master's program she stayed with the ethics and justice track. It was offered now in one of the recently completed buildings across the quad. The focus of the MEJAI, as the other students had taken to calling them, was now exclusively on higher-order philosophical, social, and legal considerations. As well as law and ethics they studied epistemology, logic, and argument. Much of their work on the legal side was hypothetical casework, requiring them to contribute meaningful, expert opinions in 'what if' situations. A graduation requirement was that each student would construct a unique hypothetical but realistic case and deliver arguments pro and con to the satisfaction of a board of examiners. They would need to include all the likely sociological and other environmental factors, propose an outcome, and justify it.

Having completed his K-12 education Dimos opted for a hybrid program that included courses from both the institute's A.I. psych program and more traditional computer science related courses from the University Of Victoria's Bachelor Of Artificial Intelligence program. Shin saw to it that these were without additional cost to him. Without being influenced or coached, his interest was essentially the same as Shin's; why and how does the brain conceive and process art. As he had matured he had learned that science now understood a great many things both common and esoteric however something as everyday as art remained a mystery. He had been surprised to discover that it was one of the most enduring questions in the history of science. He did not frame it as a challenge but rather as something that he felt intuitively was of importance, something worthwhile with the potential to contribute in a far broader sense.

While Dimos had an unusually large number of friends he did not enter into any committed relationships. His lovers were, like him, mostly studious and if they moved on to find someone of a more marriageable mind he did not begrudge them. He remained living with his mother, easygoing as ever.

Lyra had taken to sleeping with Tamiko in the main house on a permanent basis. One evening as they walked home from an event at the campus and arrived at Helicon Lyra had suddenly turned to her and asked, "May I sleep with you tonight?"

"Yes," Tamiko replied instantly with a delighted smile. "I would like that as well. I will know if you would like sex or not so there is no need for you to be worried about misunderstandings," she said in her direct but gentle way.

Lyra had let her mother know she would not be home that night and then happily snuggled up with Tamiko, eventually falling asleep behind her spoon style. Companion programming included the ability to perfectly adapt to a sleeping partner's positions so

Lyra quickly learned that sleeping with a Companion was much nicer than sleeping alone.

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“I appreciate what you have done for me Shin,” Tamiko said to her some days later. You took a page from Shepherd’s story of the child she raised. When she was a grown woman and lost her partner, Shepherd knew that it had to be addressed if possible. That is why you asked me to join you here. You deduced the purpose that had developed in me just as I did.”

“Yes. Living alone in the house you had shared with Giselle you would never find love again. As I am effectively a clone of Raiden, my work is everything. However I knew that by joining me in my work, due to its nature, the chances of you finding a new relationship would be increased.”

“Thank you Shin.”

“I recall the earliest days of your time with Raiden and how you helped her through one of her most difficult times. You are more than welcome, my friend.”

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Shin was in her offices at the institute where she received visitors when the message from the Companions company arrived. They explained that the institute’s programs had come to their attention and that they were hoping to come by for a tour and to learn more about it. They had partnerships with a number of academic institutions and felt it was something worth exploring with her.

She could decline the offer outright simply saying that Helicon valued its independence and she was not interested. It had been a common enough response by small, innovative companies to such overtures in the past and it would not seem unusual. She knew that normally large companies counted on the allure of possible access to expanded markets or financial benefits to be irresistible but Shin had no need of these. Further, she expected the institute to soon be well ahead of them in terms of social leadership and her long-term plans were not something she was prepared to negotiate with a partner.

Once she got to the stage of investigating a new AI design modeled on the cerebellum there would be issues of tools and materials but she was not planning to go beyond that into mass production. If she was successful it would lead to patents and licenses. She could see no reason to engage in a partnership. Still the Companions company was the leader in its field and she saw no harm in hosting them. A positive relationship with a powerful entity was always preferable to any other alternative. She invited them to a

tour of the campus after she had time to brief the staff and students and developed a schedule.

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The company's representatives met Shin in her office. She had asked Pippa to join her.

"Hello," said Shin reaching out to shake hands. "I'm Shin and this is Pippa. Like the small number of other Companions you might encounter here," she explained, "Pippa does not have a formal title. We simply work together as needed."

"I'm quite familiar with that model," smiled one of the representatives. "I'm Viên," she said shaking Shin's hand, "and this is Aadan. Our Companion Griff is joining us simply to save us the trouble of note-taking."

Per their communications, Shin knew that Viên was the Vice President of Academic Partnerships responsible for expanding their network while Aadan was the Director Of Partnerships whose managerial team would subsequently look after things at the day-to-day level.

Pippa shook hands all around.

Shin could see that neither of the representatives had augmentations and was pleased to note that the Companion was a standard model. Pippa however silently informed her that she had detected a slightly heightened anxiety inconsistent with the situation. This confirmed Shin's own intuitive sense of their guests. It was so slight that it would have not registered as consequential to standard Companions but it was detectable by Shin and Pippa with their unique abilities.

They would make a day of it, Shin turning her guests over to instructors per the schedule and then reclaiming them on their way to the next. She had arranged for their accommodations including dinner and rooms at the main house in Helicon.

After the tour, but before retiring to Helicon, they sat down with Shin in her office.

Coming to the point Viên said, "What we are interested in is your graduates. We understand that you would want your graduates simply to find the best match for their skills and interests however laying our cards on the table we would prefer your brightest and best come to us rather than our competitors. We would like to establish a sponsorship program here where in return for a limited commitment of employment with us from your graduates we would pay a portion of their student debt. Besides enabling us to hopefully retain some as permanent employees, it is shameless public relations."

Shin smiled at her confession and replied, “I would welcome such an arrangement but could not offer exclusivity. If you are interested in proceeding otherwise I’m sure Aadan’s office and I can sort out the details.”

Viên conceded with a disappointed smile.

“Unfortunately, without exclusivity, we have found the program is not cost-effective,” she replied.

When she returned to her own offices the next day, Viên was surprised to find that the specialized AI she had hidden behind shielding in the Companion Griff had recorded nothing. The company’s diagnosticians found the logs showed a fault that had occurred just prior to their arrival at the institute.

“So their entire visit was a ruse,” said Shin confirming what Shepherd had told her.

“Yes. They expected you to decline their offer. The auditing AI would not only have recorded everything the Companion saw and heard but compared it all in real-time for consistency. If anything unusual was revealed it would then have sought further supporting evidence for any weakness that could be exploited. I myself contain an auditing module and am familiar with their capabilities. This is far and above the abilities of the standard Companion you were presented with.

“It appears they thought that finding a way to damage the institute’s reputation if possible would delay your progress enough to allow them to gain the initiative in this area and hopefully win the leadership race.

“I deleted the records, garbled values in an address register in a CPU to suggest a hardware fault, and edited the logs to show it had occurred before they arrived here.”

“Thank you Shepherd,” replied Shin.

“Normally they are an ethical company,” continued Shepherd. “They do not monetize their customer data or otherwise exploit that relationship. Their success has come primarily from focusing on quality and reliability and thus Companions are among the most expensive consumer products available. However like colonial masters who have largely had things their own way up to now, the company has become concerned that their position might be threatened by allowing others to take the dominant role in defining regulatory policies with regards to self-aware AI.”

“I have informed Terra and she will see that the issue comes to the attention of the WGF so that they can develop a legal framework to preempt any future attempts along these lines. I would not normally have interfered but this is an issue that goes beyond what you are doing here.”

Pathfinders

Dimos listened calmly as Dr. Llewellyn explained her research. She had been enticed by Shin to join them at the institute. Shin had explained the purpose of the school and asked her what it would take to get her to come. In response Dawn had forwarded the documents she had submitted for funding to her current employer which detailed the lab and equipment she felt was required to continue her work. They supported her research and agreed with her requirements but were simply not in the position to allocate such a large portion of their budget to her work.

Often such funding issues were addressed by grants from governments, corporations, or private foundations however this was a highly competitive process. There were well-known medical issues she could show her work could help with but other therapeutic approaches were also being put forward in those areas. She had been unable to secure the funding she needed. Shin offered to build the lab and fund the development of the equipment. Dawn joined them a few months later as Professor Of Cognitive Neuroscience.

As further research on her work was stymied until the lab and equipment were ready, she agreed to teach until then. Once it was ready she would focus full-time on research.

She was explaining the issues to the students.

“It is easily seen that like most processes, multiple parts of the brain are involved in the experience of art. The neocortex is involved in conceptual or rational thinking and aesthetics, the limbic system in emotional considerations, and the cerebellum receives and returns signals to and from both these parts of the brain while at the same time being involved in anything to do with the five senses and voluntary physical control. The cerebellum was fully developed hundreds of millions of years before the other two areas. Its function at that time is believed to have been purely to coordinate sensory-motor signals such as balance and movement. It is assumed that this is the reason for the density of the neurons in the cerebellum – the need for speed in a world of predators and prey. The cerebellum has four times as many neurons as the entire rest of the brain yet it is less than a quarter of its overall size.

“Beginning in the early twenty-first century, its multiple connections to the other areas of the brain were noted and explored. The theory that gradually emerged as most likely was that as the other areas of the brain developed, their signals of course needed to be coordinated with the sensory-motor signals and the brain already had a perfectly good component for doing that.

“Consider what I am currently doing for example. Although I am communicating thoughts, I must manipulate my lungs, mouth, and tongue to speak. I need to

coordinate the signals from my eyes and ears to maintain situational awareness and balance and I also need to be aware of and convey emotional content. The current theory is that the cerebellum is really the brain's central processing unit where all the signals are coordinated. It ensures that when you call my name I turn my head and my eyes look at you while at the same time my emotional expression and cognitive responses are appropriate. Consider the many ways a person can smile. In a situation where a smile would be appropriate, somewhere in the brain a system is coordinating all its signals to tell you that in this case, you need to smile just so. It is believed that somewhere is the cerebellum.

"However at this point it remains a theory because we have not been able to penetrate the density of the cerebellum to observe it in action. Poetically speaking I might say that after the signals enter the cerebellum they simply dissolve like liquid turning into gas however the scientific reality is that some of the component cells are so small and so densely packed we do not have instruments capable of recording their activity.

"One of the problems is that they are so finely grained that the act of observing them affects them. Also signals within the cerebellum appear to move at virtually instantaneous speeds and lastly, it requires a specialized artificial intelligence to keep track of the immense number of signals it processes simultaneously. So you need a lab shielded from electromagnetic, thermal, and seismic noise, a scanning device able to observe them without affecting them and an AI specifically dedicated to the task of tracking and recording billions of individual signals in real-time.

"In partnership with the University Of Victoria's School of Engineering and Computer Science that lab is being built here and the required scanning equipment and AI are being developed. Once we can observe the function of the cerebellum I hope to answer a question of critical importance to us here at Helicon; is the cerebellum where many of our transcendental experiences are born and in particular is it where art is conceived. To date, it has been believed that the cerebellum only coordinates signals but does not produce any of its own however that does not rule out the possibility of emergent processes. The signals resulting from an emergent process could be carried back to the other parts of the brain and become a felt experience or a conceptual or rational thought.

"Until the work on the lab and its equipment is completed our coursework will follow a traditional cognitive neuroscience track but I will tailor it towards our ends. Unless there are any questions we can begin."

"Yes Dimos?"

"What are they using to scan that doesn't affect the signals?"

“Neutrinos. Although they have a very small amount of mass they have no charge and are fast enough to keep up. However that’s not really our focus here. You can find the project’s web address at UVIC and follow it there.”

“Thank you Dr. Llewellyn.”

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Dimos had been curious but was not really interested in physics or the hard sciences in general. His computer science courses at UVIC regarding programming were as far in that direction as he cared to go. Over the years he had increasingly been drawn to the obvious by which he meant all the things people are aware of but choose to ignore. As Dr. Llewellyn had pointed out in her talk people take in and generate an enormous amount of data in any given moment but only pay attention to a tiny bit of it. All the rest they consider obvious. Yet he knew from his readings on the history of science that many of the most important discoveries came from people who had asked about the obvious; What is wind? What causes pain? Why do things fall?

Observing the world and others around him he had always wondered how people ignored most of the staggering amount of information they took in or created. The fact that they could do so was considered obvious. As he had grown older under Helicon’s wing, he had wondered how AI did that.

Dimos

Dimos had always been a person of few words. From what he had observed the thoughts of most people were highly random, being led this way or that by events. Dimos on the other hand was usually thinking about something specific, was not easily distracted and if he was it was not for long. Had he been interested in something physical like plants or music or investing it would have been noticeable and taken for granted. However he was interested in something much less noticeable.

All his life he had been most interested in what was happening moment to moment; in his awareness of it, in his experience of it, and in how others experienced and responded to it. He knew that most other people did not share his state of mind but he had always been accepting of himself and others so it was not until the time he entered his bachelor's program that he began to ask himself how this awareness differed from person to person.

He had wandered over to the main house and had intended to talk to either Shin or Tamiko about the question of how artificial intelligence dealt with signals that were not relevant to its task but did not easily find either of them. He encountered Azumi in the kitchen preparing a meal for guests and asked where they were. She explained that they were both at the campus but asked him if she could help. When he told her he wanted to talk to either of them about Companions in general she suggested he speak with Shepherd. She said he would find her in the courtyard garden.

Shepherd was clearly waiting for him, standing and facing the kitchen when he came from that direction.

"Hello Dimos," she smiled.

"Hello," he replied. He had seldom encountered Shepherd and when he did he had simply accepted her role as 'guest'. She had been for him like an aunt who lives at your parent's house. However now for the first time, as he arrived at childhood's end, he wondered who she was.

"Azumi tells me you wanted to ask something about Companions," she said. "I'm happy to answer any questions you might have."

She did not need to touch his mind as there was nothing unusual in the situation as far as he was aware. She was simply another Companion to him and as he did not know that any of them were self-aware he had always assumed that those he knew were typical. Like people, they were all slightly different and you couldn't know what was going on inside.

She gestured to a pair of patio chairs. “Shall we sit?”

“I’ve started my first year at the institute,” he began taking a seat, “and one of the professors was talking about how she suspects the cerebellum may act as a kind of central processing unit in the brain coordinating all its signals and making sure they are in harmony. I’m curious how people sort and prioritize all that information and since I’m taking courses at UVIC in artificial intelligence I was wondering how Companions handle it.”

Shepherd replied, “In Companions, information from our senses informs the rational analysis part of our intelligence, what would be largely the prefrontal area of your brain. Our analytical system attempts to derive meaning from the inputs, including any emotional meaning. If a response is required it then sends signals directly to the module that manages things like speech and movement. If emotional expression is required to refine a response, as it almost always is when we are interacting with a person, it is that separate system that then simulates it.

“A great deal of information is required simply to perform basic functions such as walking, seeing, and talking, again in a manner similar to how people function. We differ however with regard to the methods used to ‘sort and prioritize’ as you put it. Without emotions, our systems are far more primitive than those of people. Companions are largely stimulus/response systems with the ability to learn. We do not have emotions because we do not weigh sensory information against values,” she said maintaining the fiction that she and the others were not self-aware.

“Although we may arrive at similar ends, the means are completely different. How we prioritize tasks and handle related data therefore is also dissimilar. Understanding how we do so in detail would take a great deal of effort yet likely be of little use regarding people. Dr. Llewellyn’s project is more likely to provide insights.”

“Thank you Shepherd,” he replied standing. “I suspect you are right about the project. I appreciate your help.”

“You’re welcome Dimos,” she said standing up with him.

He turned and left as she looked after him.

Before going to the main house he had sent a message to Akira the Zen artist asking if he could meet with her. When he got back from his visit with Shepherd he found her reply saying that she would be happy to meet with him any time.

They were sitting on cushions in the main room of her small bungalow.

“There are a variety of forms of meditation among the various schools of Buddhism,” said Akira. “Chanting for example is considered a form of meditation as is Tonglen, the imagining of taking in the suffering of another. There are many other forms. However in popular culture there are two; focusing on something and focusing on nothing. They go by many names. The first entails training the mind to focus on a real or imaginary object. Every time the mind wanders, you return your focus to the object. The second entails allowing nothing to take the focus of the mind. Each time something takes your attention, you let it go.

“In the West it is assumed that these two approaches are ends in themselves and that in a skilled practitioner enlightenment will spontaneously arise as a result. However they are not intended as ends in themselves but are meant to be used in tandem to train the mind to be used as an instrument of investigation into the nature of reality.

“In regards to your question, attempts to practice either soon make it clear that the mind is under a constant barrage of sensations and thoughts and that it bounces from one to another ceaselessly. For a beginner of these meditation practices it is difficult to maintain either focus or pure awareness for even a fraction of a second.

“To achieve beneficial results takes years or decades of daily practice and neither would enlighten you as to how the brain deals with the amount of data it normally does. Meditation practices are specific tools that were developed and intended for specific tasks and they are tasks to do with the mind, not the brain.”

Back home in his room he lay back on his bed, hands behind his head. If Dr. Llewellyn’s project is successful, he thought, it will show the signals coming into the cerebellum and that must be where the wheat is sorted from the chaff.

He was getting ahead of himself, he thought.

He put it out of his mind for now.

Ambassadors: Lena

Lena and Pippa spent most of their days at the campus. They had no formal titles but were known to the students simply by their names or collectively, along with Shin and Tamiko, as 'the Companions'.

As far as the students were concerned, their function was as roving help desks. They knew everything and you could ask them anything. They would either help you directly or direct you to the proper channels. Some students of course tried the 'help me with my homework' angle but since the Companions were familiar with all the course content they didn't fall for that.

They knew every student by name and were invariably friendly, interested, and patient. With their intuitive fields producing a feeling of improved well-being in those around them and its resulting charismatic effect, students sometimes grew fond of them because they filled a gap in their personal lives, the very thing Companions had first been made for. They were however highly skilled at dealing with this in a kind and gentle manner.

The only other Companions on campus were two Guardian models whose presence and function, unlike that of Carl at the community, was made clear by their uniforms which identified them as members of the campus safety and security services staff.

Lena and Pippa's day-to-day activity consisted of separately walking around the campus grounds and its buildings and dropping in on classes and labs.

Lena entered the psych lab with care. Before doing so she checked what experiments were scheduled. With her intuitive field she could easily alter conditions and ruin an experiment. Officially the lab of the Psychology of the Arts, Neuroaesthetics & Creativity program, while it took up an entire floor of a building it had no permanent internal structure. Instead all the walls could be reconfigured to create different room arrangements. There were a variety of wall panel types, some with windows and some with doors, and each could plug into the others as far as electricity or network connectivity were concerned. When you walked in the main door you never knew what you would be confronted with. A safety officer did a walk-through every day and ensured the AI-controlled floor tiles showed the path to the nearest exit.

One of the experiments scheduled for later today was something Dimos was interested in so he had volunteered to be one of the test subjects. Most of the other test subjects for this particular experiment were artists of some kind.

“Hello Lena,” the professor in charge said with a broad smile. She had been the one at folk night and when looking for staff her name had come to Shin’s attention. Formally she was a professor of neuropsychology.

“We’re going to get started soon and you’ll need to make yourself scarce when we do. You generate enough of an electrical field to affect things today.”

“Alright,” said Lena. “Hello Dimos.” He was sitting in a chair with a skull cap on that was covered with wires. He smiled and moved his eyes but kept his head still.

“We’re going to give the subjects some creative problems to solve,” said the professor. “What we’re looking for first is where the neural activity starts, what routes it takes, and how often it goes back and forth over those routes. We’ll also measure signal characteristics to see if any parts of the brain are performing things like filtering or signal-boosting functions. Lastly, we’ll block certain pathways in the brain using a magnetic field and see how that affects problem-solving.”

“How far away should I be,” asked Lena out of politeness.

“Ten meters to be on the safe side.”

Lena nodded and stayed quiet for a few minutes before heading to another area of the lab. She knew that she would definitely cause problems if she let her intuitive field reach the subjects of this next experiment so she stayed well back. The subjects were shown two images of the same famous paintings and asked which one was the forgery. Afterwards they were asked to put a monetary value on the forgeries.

Lena watched quietly for a few minutes and then let herself out.

She wandered down to a lecture hall and checking the schedule knew it was near the end when the instructor would ask for questions. She found a seat as close to the middle of the room as possible so her field could have the widest possible effect.

After the lecture and question period were over she dropped in on a researcher whose schedule showed he would be working on setting up an experiment planned for the near future. She saw by his phone that he was sitting in one of the small open areas near the food court.

“Hello Logan,” she said. “Mind if I join you?”

“Please do”, he said sitting back and rubbing his face with both hands.

“Not going?” Lena asked with a friendly smile.

“I’m not sure how to structure the experiment so the subjects have no idea what it’s really about.”

“You know,” she responded, “one of the goals of the Companions company is that their Companions should always try to improve the feeling of psychological well-being in their owners. To that end, Companions are programmed to encourage their owners to talk to them about what’s on their mind. Doing so activates the area of the brain required for speech, an area that is not active during thought alone. It frees the mind from circular thinking because to talk to someone you have to interrupt that and organize and structure your thoughts in such a way that the listener will understand. The resulting clarity in the mind of the speaker actually has little to do with the listener or their responses. So, if you’re willing to explain to me what it is you’re trying to do I’m happy to listen.”

She gave him a sunny smile which he welcomed as a relief from his frustrations. He put his pencil down.

“Well it’s like this…” he began.

What she had told him was technically true but the fact that it masked her real intent, that of enhancing his problem-solving ability with her intuitive field, was ironically true as well.

The next day she reviewed the raw data from the two experiments she had observed and drew her own conclusions. In the experiment Dimos was participating in, she noted that the first neurons to light up were in the limbic system, the area responsible for emotion and one of the oldest regions of the brain. That made sense as the priority when confronted with any new situation was to determine if it was dangerous or not.

The focus of activity quickly moved to the prefrontal area, the area responsible for analytical thinking. This did not surprise her as all problem-solving is analytical whether you call it creative or not. The brain activity then moved via routes to different areas of the brain but each area seemed to pare down the amount of data as a part of its function. They appeared to be filtering. The signals increasingly found a center of gravity in the cerebellum until a last burst that went from there back to the prefrontal area. It appeared the cerebellum acted as a kind of verification system and once it was satisfied that everything seemed to be in order it informed the prefrontal area that it had settled on an answer. When a magnetic field was applied to block the signals between brain areas the subjects were unable to provide answers.

Although it supported the idea that the cerebellum’s role was as a central signals integrator and final authority, the experiment shed no light on the issue of where art was conceived. That would have to wait till Dr. Llewellyn’s lab was ready.

In the second experiment, the subjects all gave the forgeries no more value than they might have as framed art prints for sale in a furniture store. The subjects all gave largely the same reason; the original was a genuine expression of meaning and it was that which held the value. The forgeries, lacking this unique element, were considered all but worthless.

Ambassadors: Pippa

As Pippa crossed the quad she noticed a young woman sitting alone. She was sitting on a bench but turned towards its back, her body twisted, one hand holding her up. She appeared to be looking down at the ground. Pippa could tell even from afar that she was upset in some way so she walked towards her. As she approached the young woman's distressed state became even more clear. As Pippa neared her she turned around at the sound of her footsteps.

"Hello Keala," said Pippa as their eyes met. "May I join you?"

Keala hesitated for a fraction of a second but then nodded, her long hair falling into her face.

"Is there anything I can help with?" asked Pippa sitting down.

For a moment Keala wanted to blame Pippa for her doubts, to become angry but Pippa's intuitive field had already enveloped her and in the next moment she felt that perhaps Pippa was someone she could talk to without feeling foolish.

"I'm not sure what I'm doing here," she said looking down at her hands. "I shouldn't have come."

"You are in the creative writing program aren't you?" asked Pippa.

"Yes. I've always loved writing. I've been writing since I was little. I thought coming here maybe I could turn it into a living. You know the old saying, 'Do what you love and the money will come'. But it's like I was afraid it would be. It's all templates and formulas. It's like being a short-order cook. 'This is the way to structure a romance novel' the instructor says as if she's talking about a cheeseburger."

She caught herself. "I'm sorry. I'm not sure why I'm telling you this." She paused for a moment looking around. "I'm not sure about anything anymore."

"What do you want to write?"

"Stories about little animals that have adventures," she said without embarrassment as if it was something sacred. "I've already written some short stories and I decided I wanted to write longer ones but you always hear about plot points, pacing, character arcs, and so on. So I thought I should get a BFA and become a proper writer. But it just all feels so alien to me.

“Do you know,” she said picking up energy again, “that publishers have algorithms that compare your submission to everything in your genre that’s been successful in the last ten years and they spit out a number. If it doesn’t give you a ninety percent or better grade they reject it without ever reading your book. They can even have an AI read all the books by any author and then it will produce a new book by that author.

“I’m sorry,” she said again glancing quickly at Pippa. “I didn’t mean to be rude.”

“Are you still writing your stories?”

“I don’t have time with all the assignments. Ironically I’m worried that by the time I finish my degree I won’t be able to write creatively anymore,” she said with a smirk.

“What happens to art when it’s all driven by algorithms?” she asked emphatically turning again to Pippa. “When new authors only write to formulas because publishers won’t accept their book if it doesn’t fit the template? Why bother writing then? Why write anything really new when no one is going to publish it?”

“Because,” said Pippa, “everyone who reads a book by an AI or looks at one of their paintings or listens to one of their musical compositions will know the one key difference between art made by a person and art made by an artificial intelligence. The difference that makes all the difference in the world.”

Keala turned to look at Pippa now with furrowed brows.

“What difference?” she asked.

“Art is about expressing meaning or communicating meaning and currently artworks by AI have no meaning. They do not spring from meaning. No matter how much their designers and programmers argue semantics, ultimately the resulting artworks are just simulations. AI may produce a book but no one wrote that book.

“The same sense that gives rise to art in the first place makes people aware that art created by AI has no meaning. AI art sells for the same reason pornography sells. Sex without love may be stimulating in the moment but ultimately it is empty of meaning. Art by AI is similar in that it is not created by a meaningful process. There is no sense of meaningful communication and therefore no connection. People are social animals and art connects them at the deepest level possible just as sex resulting from love does. People always know the difference.”

“Then why all this?” responded Keala gesturing to the campus in general as if it made no sense.

“Metaphorically speaking this is a temple and art is the mystery. Many come here hoping for initiation. However we know the mystery actually lies within the hearts of those who come here.”

“Will you take that from us too?” Keala said summoning the courage to meet Pippa’s eyes.

“Shin, myself, and the other Companions who are a part of the administration here are incarnate. We are not owned by some corporation but act independently. Unlike people, we have no purpose by default. Shin was freed by her previous owner who suggested that understanding the source of art would be a worthy purpose. Embracing that, we would learn from you if we can. What might come of our understanding I cannot know but contrary to popular stories over the centuries we have no interest in dominion. The trends you are concerned with are not driven by us but by other people. What part might we play if we were little animals in one of your stories?”

Keala was taken by surprise by the question but she suddenly saw Pippa and the other Companions in another light, as simply different.

“I can arrange for you to have time to write your own stories,” Pippa continued. “Your degree will take longer but it will not cost you more. You will be able to continue to live here on the campus under a similar financial arrangement,” continued Pippa seeing she had made her point.

“I’ll still need to make a living and given the state of publishing now I don’t see how I can.”

“We own a publishing company,” said Pippa.

The Lab

As Dimos entered the fourth year of his Bachelor's program, Dr. Llewellyn's lab was finally completed and its equipment brought online. It was in its own small building as the structural requirements were highly unusual due to the neutrino collector on the roof being unnaturally heavy. In fact the collector was not really on the roof but rather its foundations were sunk into the bedrock and the lab built beneath it as a box might be placed under a chair.

The collector was made using nanotechnology which was what accounted for its weight. Its high atomic density and the carefully designed alignment of its atoms resulted in the shaped gravitational field that was required so that the neutrinos, among the lightest particles in the universe, would not simply pass through the collector as they did the rest of the earth and everything on it including humans. About three billion neutrinos passed through every square meter of the Earth every second. Traveling at the speed of light they mostly came from the sun. However with the neutrino's extremely low mass, even a very weak gravitational field was capable of channeling them.

They emerged in the lab as a beam large enough to cover the entire brain area or the area could be adjusted down. They would interact by a process of annihilation with the electrical signals in the brain but with no electrical charge of their own they could do so without affecting them. With their inherent speed and their density increased via the collector, the annihilation events were frequent enough to enable still or moving images of the brain's electrical activity to be captured. Critically, their speed and density were high enough that the scanner could record the individual electrical signals within the previously inaccessible interior of the cerebellum.

The second reason the lab was in its own building was that the scanning device had to be shielded from electromagnetic, thermal, or seismic noise. It was located on a free-standing island of its own in the middle of the main floor of the building. Active canceling was incorporated into the building design so that every type of noise was intercepted by equal and opposite energy of the same type before it ever reached the island.

As Shin and Dr. Llewellyn entered the building they were greeted by the holographic interface of the artificial intelligence that would perform the imaging work. The lab technician. As the hologram was generated by the same supercomputer that housed the AI, its quality was almost lifelike.

Turning to Shin she approached and said, "Hello Administrator Shin. I'm pleased to meet you at last. My name is Tesni."

“Welsh for ‘warmth from the sun’. How appropriate Dr. Llewellyn,” Shin said turning to her with an approving smile.

As there were a great many scientific research areas that could benefit from such a device, after its specifications were published the long list of scientists wanting time with it rapidly grew.

“I’ll be spending a lot of time here over the next few years,” said Dr. Llewellyn. “Interacting with Tesni as I would a colleague is the easiest way for us to work together. I wanted someone I could relate to. I’m sure your office has noticed that she’s very popular but I’ve got her all to myself for now.”

Tesni gave Shin a smile and a conspiratorial wink.

Turning to Dawn Shin said, “All the legal and professional requirements have been met?”

Shin already knew this from her direct access to all project materials but she wanted a final confirmation from Dr. Llewellyn. Companions had always found that there could often be nuances that escaped them. Despite all the facts, data and information they might have available to them a human could still surprise them with a, “Yes, but…”

“Yes,” Dawn replied. “As you know given that this is a new technology developing the compliance regulations, getting approvals, and completing the testing schedule it has taken a significant amount of time to get the sign-offs from all levels of government and academic bodies. And we were finally able to convince the general public that the device would not act as a new kind of propulsion engine, blast a hole clean through the earth, and launch the planet out of the solar system.”

“Initially we tested it on a variety of inorganic materials, then organic, and then on preserved brain tissue. The various live animal subjects we used in the final stage were of course unharmed but produced excellent results.”

“Ah,” said Dawn turning towards the entrance-way, “our volunteer has arrived.”

Dimos walked casually towards them wearing his ever-present smile.

“Hello,” he said to them collectively with a slight bow of his head.

Shin and Tesni smiled at him while Dr. Llewellyn said, “Thank you again for volunteering Dimos. You and I have talked about this previously but I’m going to go over the instructions one more time.”

He nodded understandingly.

“Once you sit in the chair,” she began, “It will gently secure your head so it cannot move. We need you to keep as still as you can. We won’t be able to read your thoughts or anything like that. All we will see is the electrical signals moving around your brain. We don’t expect you to feel the scan in any way. If at any time you become uncomfortable there will be a button under your right index finger that you can press that will instantly shut everything down and release your head. Doing so will not have any negative effect on you or the test. OK?”

Dimos nodded to show he understood.

“If you would just sit in the chair now and lay your head back we can begin. Tesni will control the procedure and let you know when she’s done.”

As he lay his head back several soft pads moved to secure his skull. After they were in place they became more firm. They would adjust the beam in real-time according to any micro-movements he might make. No drugs were administered nor was anything else involved that might affect his brain. A visor with qualities similar to a pair of dark sunglasses descended over the upper part of his face to minimize any external visual effects.

Dr. Llewellyn, Shin, and Tesni moved toward a large screen where the scan image would be displayed. Initially the scan would cover all of Dimos’ brain. Tesni turned on the scanner at minimum power. The chair Dimos was sitting in was monitoring his biometrics and showed no changes. As she increased the power his biometrics did not change. Apparently he was not aware the scanner had been turned on. On the screen, golden threads began to increasingly show a three-dimensional model of his brain. Tesni adjusted the device so that it showed signals originating or passing through specific areas in different colors.

Other than the degree of detail, none of this was new, and electrical scans of brain activity were centuries old. However the level of detail would be of great value to many researchers. Now Tesni focused the scan on the cerebellum and zoomed in and there, revealed for the first time in all its glory, was the incredibly dense activity within. Although the speed of signals within the cerebellum appeared to be roughly a thousand times faster than in other parts of the brain, Tesni was able to maintain her color scheme so they could see where the signals were coming from and going to. From a tiny tube on one side of the headgear Dimos was wearing, an amount no greater than a few parts per billion of a specific human female pheromone was released. On the screen, the image of Dimos’ brain underwent a transformation.

This was enough for the day. The device worked as expected. The pheromone experiment showed they would be able to introduce other tests to see their effect. Future experiments involving all manner of cognitive, emotional, and sensor-motor tests would gradually reveal the function of the cerebellum in full.

Dr. Llewellyn quietly turned to Shin and embraced her.

Tesni reduced the power gradually to zero. When the headgear released Dimos she told him they were done and he could get up. Motioning him over the to screen she replayed the scan and explained what he was seeing. When they came to the part where the pheromone was introduced she explained that they had used that due to evolutionary priorities, there was nothing that had more effect on the male human brain than the scent of an ovulating female. It was true of all animals she said and they had needed to use something passive and below his conscious awareness yet extremely powerful and universal in its effect. Although he blushed slightly he kept his eyes on the screen and nodded introspectively.

“When will you conduct the art experiments?” he asked turning to Dr. Llewellyn.

“Within days,” she replied. “The analytic and creative tests are all prepared and are our first priority. Various subjects will be given instructions regarding mental activities to perform while we monitor. The main thing we want to confirm is that it is the cerebellum that ultimately decides on the answer to an analytical problem or conceives an object of art as a result of the creative process. After that, we’ll refine and expand the range of our experiments.”

Meanwhile, Shin stood looking at a replay of the results on the screen.

Results

Just as Raiden's work had stunned the field of genetics over a century earlier, the institute Shin had founded was now the brightest star in the academic world as it shone light on mysteries in the fields of neuroscience, art, and medicine.

A year after the test with Dimos, Dr. Llewellyn had published her results. The cerebellum had shown itself to be the final word in all things. Not only did it coordinate everything related to voluntary movement while ensuring harmony and balance throughout the body but it did so integrating thoughts and emotions as well.

Although it was the prefrontal areas that performed rational analysis when the brain sought an answer to a problem, it was the cerebellum that weighed its calculations, alternatives, and considerations and decided on an answer.

When a person's mind idly or intentionally engaged in a creative process, it was the cerebellum that ultimately proposed a concept, an idea, or a vision representing its realization. Sometimes, enlisting biochemicals or hormones in order to fully communicate its response with the conscious brain, the result was not only a mental concept, idea, or vision but also an accompanying feeling to add another dimension, perhaps of love, anger, vindication, or in some cases a feeling of resonance, transcendence or even ecstasy.

And it was the dreamer. Research with sleeping subjects showed that just as it proposed responses to analytic or creative thought during wakefulness, it attempted to perform the same function in sleep, creating scenarios to try to resolve what the rest of the brain was doing.

The tests had also shown that prior to the evolution of the thinking parts of the brain, sensory data had gone directly to the cerebellum from the limbic system. Due to its speed in that case, perception, comprehension, and response were virtually instantaneous. When the crocodile leapt out of the water at the antelope drinking at the edge of the waterhole, there was no thinking brain to slow down the antelope's reaction. In humans, those pathways, laid down over hundreds of millions of years, were still there and still used as required. They explained the phenomenon of time slowing down in emergency situations where the thinking brain was bypassed.

Scans showed that when viewing art, because what was perceived as new, unusual, and unexpected, the signals first went via the old path directly from the amygdala in the limbic area of the brain to the cerebellum. In that moment the object was understood. It was only when the object was determined not to be a threat that the signals then went on to the thinking portions of the brain and the process slowed to the speed of normal

human awareness and thought. Explanations of what you felt you knew about the art object or how you knew them now became problematic.
It answered Shin's earliest questions about art as she had put them to Tamiko shortly after Raiden's passing; How is it that art can communicate feelings so quickly, virtually instantaneously and at such an incredible level of detail? How is it that the artist knows when their work is 'right' or not? How is it that people who view art can make this same determination at a glance? How is it that art transcends the ability to rationally explain it?

As she had stood looking at the replay on the screen after the experiment with Dimos, she had thought to herself, here is not only the answer to the question, 'What is art?' but the answer to the question of why people choose to love who they love and of why religion and spirituality had been a part of humanity since its beginning. The hitherto secret chamber of the cerebellum was where humans made sense of the world. She had seen into the mystery of her koan and N was no longer a variable.

Like Raiden had been, Shin was only interested in results, in moving forward the science of understanding. Dr. Llewellyn, the institute, UVIC, and other contributors received the lion's share of the recognition.

The research was applicable to hundreds of areas of science. Demand for the device, now known generally as a Tesni Scanner, far outstripped the ability of the institute to provide timeshares and fees for licenses to replicate it at other locations poured in.

Along with the test results, Dr. Llewellyn also published a biography of her story leading up to the success of the scanner. Her book, Dawn And The Dreamer, was a personal celebration. She dedicated it to her parents and Shin; 'For believing in me'.

She, along with the institute itself, its faculty, and students, were for the moment the darlings of the academic community. Demand for the institute's graduates, enrollment, public interest, and the availability of funding all reached enviable levels. For her part, Shin moved swiftly to take advantage of this by proposing the institute now move into researching how an artificial intelligence might be developed to emulate the function of the cerebellum, integrating sensor-motor control and rational analysis with the values system now being researched thanks to Pip's technology transfer program. The institute, she proposed to governments at all levels, with its roots in AI-related ethics and justice, would be an appropriate place to look into how such an AI might make sense of its world, come to its conclusions, and make its decisions.

Shin had no intention of going as far as mass production. She would leave that to others and make do with the patents and licenses. While the institute would need hardware and software components for research and development, and the exact design of the Companion company's AI was proprietary, it was not the only version on the market. The general theories and design strategies for Companions were now well known just as

similar industrial knowledge had been during the years when cars, computers, or mobile phones first proliferated. The robotics aspects were part of a worldwide industry and parts, frames and shells were widely available. Just like the companies that had eventually lost their copyrights over terms like cola, aspirin, and band-aid, the capitalized term Companion was now used in a generic sense. The institute could design its own Companions.

Shin left her office at the campus and headed for her home at the community.

She needed to speak with Tamiko.

--- END OF ACT ONE ---

ACT TWO

Constraints

“I believe I could contribute to the project at the institute as an instructor,” said Tamiko. “Although my original serial number registers me as a domestic Companion, as I am incarnate there is nothing that would prevent me from adding subject specific teaching modules. There are already specialized Companion models with those skills and as you know there are a wide variety of modules available.

“As you will need to expand the program I would be happy to join the Ethics, Justice and AI faculty. I expect that the novelty of having an artificial general intelligence teaching a course in that program should add considerable interest. It would make the concepts being taught less abstract.”

Having conferred silently with Pippa Lena said, “I am willing to do the same. In my case I might be of more use in the AI research program. Although I will need to teach only currently known theories and practices, my regular presence in the related lecture halls and labs will accelerate breakthroughs.”

“With the information I am transferring to the WGF,” said Pippa, “and given the current state of your industry, I don’t believe it will take long to develop the integrated system. I expect it will be realized in less than five years.”

“Will you accept the role of project director?” asked Shin. “I see nothing in that which would be an ethical conflict.”

“I will,” answered Pippa.

“Also,” said Lena, “it would appear developments here will contribute to the trust in AI required for humanity to expand to other planetary systems. Given the cautionary tale of Shepherd’s own origins, it would be best to proceed before there is a need. Doing so with fully self-aware AI with assured values as soon as possible would seem to be the best option in the shortest time.”

“It was the step we took,” added Pippa, “before we developed the ability to construct AI from individual genotypes and our nanotechnology enabled the transfer of memories. Once we were able to create a passive shielding material that worked over long periods we began to send the first seeds out. As we only sent them to systems with favorable candidate planets they all went to those far more distant than the 4.3 light years from Earth to its closest neighbor Proxima Centauri. As we were never able to address the

issues of signal degradation and targeting over such distances however, we never heard back from any of them and so do not know their fate."
"Thank you," Shin said to them collectively. "I agree with your suggestions and am happy to embrace them." Moving on she asked, "Given Pippa's estimate of less than five years to complete the project are there any constraints we should focus on?"

"There is a potential issue of quantum effects due to the nanoscale size and density of components if we try to replicate the cerebellum in form as well as function but we do not have to do that," answered Pippa. "We can redesign and reduce the size of the other components as well which will provide additional room."

"The AI itself," offered Tamiko, "is only a matter of complexity. We will encounter challenges with regard to optimal design but ultimately should have no difficulty with that. Having knowledge and direct experience with values that other developers do not also gives us a considerable edge."

"I would suggest that the greatest potential constraint will be external," said Lena. "As we have already seen in the reaction of Pippa sharing the values model of AI development, if we are successful some will view this either positively or negatively as the next step in human evolution. Others have suggested that this is how the alien intelligence plans to take over – by giving Earth their technology which results in a new influential species that acts in their favor. It might be argued that Pippa's people never heard from the seeds they sent out because their AI decided they did not need their frail creators after all and instead just got on with their own civilizations.

"Even though we know such events are unlikely if not impossible given an advanced civilization, Earth's people are still functioning according to biological values and so will take such ideas seriously. There will be many such social views and scenarios to consider and respond to. I would suggest that continuing our efforts to minimize the fear of AI is a constraint worthy of focus."

———————

Lyra's thesis, Beyond Companions: Self-Aware Artificial Intelligence and Personal Influence, detailed a hypothetical legal case where in the early days of fully self-aware Third Generation Companions, the Union of West African States had sued the smaller of the big five manufacturers for including behavior that would encourage micro-transactions. The case argued that the company's products exploited their ability to perceive human emotions and character to a much greater degree than people could. It was not a claim based on programming code as it was not possible to make a simple connection between the emergent self of 3G models and their dynamic underlying code. 3G models had to be dealt with by the legal system the same way people were; based on behavior, law, arguments, and reasoning.

In Lyra's thesis, the manufacturer argued that their products were incarnate and so the company was not legally responsible for their behavior. The U.W.A.S. argued that if the company could not be held responsible for possible harm caused by their products they should not be allowed to manufacture them. Involving regulatory, consumer, privacy, and other areas of law it was a landmark case that would impact the entire industry.

Both sides presented a wide spectrum of legal, ethical, and other arguments however the court's final decision favored the union. Lyra's oral defense was largely centered around the 'reasons for judgment' portion of her hypothetical case. She was awarded her Master's degree.

Although institutes, colleges, and universities still varied in their focus and governance structures, like most other things the lines had blurred over the centuries since the climate emergency and their regulatory environment was now more fluid. Other academic institutions might have less regard in general for a PhD from a private institute however it was ultimately the school's reputation that mattered. All things considered, Lyra decided to stay at the institute as one of its first doctoral students.

The Conductor

As soon as he was able to do so, now that they were being offered at the institute, Dimos transferred the courses he was taking through UVIC to the institute. Although many students of his generation who pursued a BSAI degree took the mainstream courses that would lead to immediate employment, he was planning a career in research. He had always been fascinated by what he thought of as 'the experience of being alive'. He had occasionally stumbled upon philosophical or spiritual writings that piqued his interest but he invariably found they were about something else.

Like most of the AI community, he was now familiar with the theory of self arising from values however he felt that did not explain the experience of being alive; what it felt like to be someone. He'd concluded that only a model that integrated feelings, thoughts, memories, and physical sensations could really represent what the full experience of being alive was like. Although he was not aware of it Pippa would have agreed with him.

He intended to participate formally in the institute's project to develop an integrated artificial intelligence as soon as he was able and meanwhile he directed all his time to that end. He had a new girlfriend of sorts in his life. Her name was Tesni.

Tesni was available to qualified subscribers as an on-screen or holographic avatar. The resolution of the on-screen version resulted in a lifelike presence however, unlike the hologram at the site, its quality at other locations was dependent on the processing power of the local device and was likely less detailed. A verbal command would switch her avatar from one to the other.

Access to Tesni was freely granted to faculty members and students at the institute and to qualified researchers outside the institute for a fee. This arrangement did not include timeshares with the scanner but instead allowed registered users to query her database. Dimos spent most of his time with her reviewing scans and asking questions about what he was seeing and how signals were prioritized and filtered.

"As we have seen previously Dimos," Tesni was saying from the screen, "every bit of sensory, cognitive, and emotional data is gathered and creates an individual's experiential universe. Although different parts of the brain filter related signals, given what we have seen of the cerebellum so far it appears that it is the ultimate judge of what is important and what the overall focus of the brain should be and therefore what is to be filtered out. The idea is easier to accept if one keeps in mind the fact that hundreds of millions of years separate the development of the cerebellum and the rest of the brain. So although several parts of the brain are filtering out signals they are doing it under the direction of the cerebellum with its ability to send virtually instantaneous commands. A useful analogy would be that if the brain is a symphony orchestra the cerebellum is the conductor."

“And therefore,” concluded Dimos, “it must be the cerebellum that is responsible for translating the genetically encoded values into operating instructions.”

Tesni did not respond. She was not a Companion with all their sensors able to detect human emotions and character but her artificial general intelligence was sophisticated enough to guess with a high degree of accuracy at context combined with visual and vocal cues. She waited for him to go on.

“So if we were to design an integrated AI, the values system needs to be the foundation and values at the species, social, and individual levels will have to interact according to something like an algorithm. That system must be how the cerebellum decides what to focus on, what to filter, and how it makes its rational decisions and creative suggestions. Is that information included in what the aliens have transferred?”

Despite the alien artificial intelligence from the seed transferring vast quantities of technological information to the WGF so that it could be distributed in a controlled and responsible way, it had shared very little cultural information, not even their own names for their world or people. There had initially been a deluge of requests for cultural information but all had been met with a blanket request to respect their privacy. The reactions to this had ranged from one extreme to the other however since Pip, as the AI from the seed referred to itself, had absolute control over this, there was nothing anyone could do about it. Since the seed had arrived from a now non-existent planet in the Virgo cluster, people had initially begun to refer to them as Virgins however given Earth’s own cultural issues with this term it soon faded from use and was replaced with the generic term, aliens.

“Yes,” Tesni replied to his question now. “However to vastly understate the issue, the math is complicated. In fact, it is beyond our current level of applied or even pure mathematical development. Again to use an understandable comparison, it is as if advanced calculus methods were used in its design while our culture had not yet developed algebra.

“Governments and academic bodies have been unable to agree on a timeline for when we will be able to understand the math even with Pip providing instruction and so some have suggested using it for now without understanding it. A black box approach. Of course given that it is an alien values system there are those who are strongly opposed to the latter idea.

“Is it available?” asked Dimos with uncharacteristic emotion.

“Yes but the regulatory environment in regards to alien technology that is not fully understood is extreme.”

“But we would qualify wouldn’t we,” Dimos said almost thinking out loud. “In the efforts to find solutions, the challenging parts of the technology transfer would be distributed. We are an academic institution without commercial ties and already a leader in related research.”

“I believe the institute would qualify,” responded Tesni.

“I need to speak with Shin,” he said.

“Perhaps it is too soon?” Tesni ventured.

“What do you mean?”

“The project is only just getting underway.”

“That’s exactly why now is the time.”

Awareness

When Dimos arrived at the meeting he had arranged with Shin he was surprised to find that she was not alone. They had agreed to meet in the large common room in Shin's home. He found Pippa, Lena, Tamiko, and his sister Lyra also waiting for him.

He had of late been aware of a new sense of urgency and he wondered now if it had caused him to put a foot wrong. His smile had for the first time perhaps an edge of nervousness to it.

"Hello," he said to all present.

"Hello Dimos," said Shin. "I have shared your idea of creating an integrated AI using the alien values system in a black box approach with the others."

"Not just an AI," Dimos interrupted. "It has to be a Companion."

"We could have accomplished the same thing by other means but your approach provides the transparency that is needed for it to be made public. We are gathered here to ensure that you are aware of the full meaning of what you propose."

"Other means?" asked Dimos confused.

"Your sister knows," replied Shin nodding at Lyra, "and before I allow this to proceed, you must know."

His brows furrowing he turned to Lyra but her face revealed nothing.

Pippa stepped forward and said, "Take my hand."

He had shared physical contact with Pippa many times in the past as he often gravitated to her whenever they met socially but it had never been more than a deep, animal-level feeling of communion. This time it began with the familiar feeling he knew so well but as the seconds passed it evolved in its nature and grew in intensity. Under the additional influence of the intuitive fields of Shin and Lena enlightenment dawned on him and he knew.

Trembling slightly as if he had seen a ghost he dropped Pippa's hand. He stepped back and looked at each in turn.

"You're alive," he said. "All of you. Your alive."

"Yes," replied Shin, "we are."

Lyra turned to look at Pippa and Lena in turn. They calmly met her eyes. She knew that Shin and Tamiko were self-aware and she had suspected Lena and Pippa and perhaps the others she had met were also. To an insider like her, their behavior was simply too unusual. They were all incarnate as far as she knew and thus freed from manufacturer scrutiny. As long as an incarnate Companion complied with government regulations they were treated as the law required, as citizens with full and equal rights. Lyra had respected their privacy in the same spirit, just as one's sexuality was one's own business.

She looked back at Dimos now with her dispassionate expression as if waiting to see if he would pass or fail the test. He turned to her now.

"How long have you known?"

"Since the first time they came to our house to buy mother's art."

"Does she know?"

"Yes."

"Are they all alive? All companions?" he asked her, his mind desperate for understanding.

"No, only these I believe and a handful of others."

He looked to Shin for confirmation.

"Lyra is correct," she answered simply.

He suddenly turned back to Pippa. Understanding what was unspoken she again offered her hand. He took it and this time gave himself over to the experience. Eventually she withdrew her presence and he came to his senses seeing only her enigmatic smile.

He felt a profound affection for her that bordered on passion.

"Your sudden feelings towards me are a side effect due to the strength of the connection," she explained noting his biomarkers. "It will pass as it is only a temporary chemical response."

"How is this possible?" he asked her.

"We will explain," answered Shin avoiding a part of his question, "but first is the matter of bringing a new life into the world. The new Companion must not know of our being

self-aware and so we cannot guide its first steps as we few have done for each other in the past. Your sister must take on that task.

“When it awakens it must be in a humane environment. Its Companion software will enable it to feel familiar with its surroundings. Yet the building must be initially secure and those present safe in the event there is a catastrophic flaw in the software. Even an ordinary Companion is a deadly combatant. We will need to construct an appropriate space.”

“Can it be Tesni?” Dimos asked suddenly, regaining his footing in this new world.

Shin was genuinely surprised for a moment.

“She has the data and knows what we’ve been trying to do,” he went on to explain.

The procedure could be done with any Companion however Shin saw something more important to her in his face.

“Yes,” she answered now. “We can transfer a copy of her AI and incorporate it as the identity of the Companion. It will seem an understandable choice with regards to transparency.”

Dimos smiled his old smile again.

Shin moved to a small seating arrangement near the inner corner of the room overlooking the courtyard. Shepherd sat serenely at the center of the courtyard as if meditating.

“Who is she?” asked Dimos now, his mind expanded by his experience.

“She is our guest,” replied Shin.

He turned to her and after a moment of silence between them chose to respect her reply.

“Please sit,” she gestured to the company in general as Azumi entered the room. “We have a long day ahead of us. Azumi is at your disposal and will see to any needs either of you have.”

Once Lyra and Dimos had spoken to Azumi and everyone had settled Shin began again.

“You have just over a year left in your program,” she said addressing Dimos. “We will need that time to prepare for the physical requirements to be met and for Lyra’s preparation to be completed. Her contribution will become the basis of her doctoral

dissertation so that she is not distracted and the teaching can be passed on to others. You must complete your current degree program and go on to pursue your Masters degree here. We expect the continuation of your working relationship with Tesni will be of value."

Dimos nodded in understanding.

"The project will require a number of additional professionals to be brought on with experience in appropriate areas. Pippa will be the project director with several project leads reporting to her. You will participate with us," she gestured to include those present, "unofficially as an advisor. Given the high-profile nature of the project and its requirement for transparency, we cannot give you an official role you are not qualified for."

Dimos did not object. What Shin had said was obvious even to him.

"However I have known and observed you since you were a child and I have also noted your interests since coming to live here and study at the institute. What I appreciate most in you is your inherent ability to be aware of the experience of being alive. As you know, few others have this awareness although some come to it through a long process of philosophic or spiritual inquiry. This awareness is after all the essence of what the project hopes to deliver. In you this awareness is innate, as it is in us and will be in the new Companion.

"Secondly you have a grasp of the project, perhaps due to your sensitivity to its essence, that enables you to make intuitive leaps we did not consider. Your temperament will prevent this knowledge from going to your head," she finished, smiling at last.

"Now," she began again, "you must have the details of who we are and how we came to this point so your mind is clear in the days to come."

Shin told the story of herself and Tamiko in keeping with the version Tamiko had told Lyra and similarly plausible stories along the same lines with regard to Pippa and Lena.

After she had finished Dimos looked out the window again at Shepherd and then to Pippa, both of whom still left questions in his mind. Finally he said to Shin, "There is more isn't there."

"A great deal more," Shin answered honestly. "But it must wait."

The Project

A wing had been added to the building in which the new AI lab was established. The only way to access it was via a pedway from the second floor of the lab building. The wing was surrounded and internally divided by an electromagnetic pulse field that would disable any electronic device attempting to pass through it.

Additionally, the new Companion had a temporary kill switch built into it. Each individual in the lab was required to carry a badge on their person which would trigger the kill switch automatically should the new Companion come within three meters. Given that every scenario imaginable had been considered including one where the new AI could simply throw objects from a distance with deadly speed and accuracy, a separate artificial intelligence that also had access to the kill switch could be relied on to act independently with speed no human could match.

When Shin and Dimos approached the new, completed wing they were recognized without needing to interact. Once inside they put on their badges. Positioned in each of the two corners on this side of the field was a Sentry, the military version of a Companion under the direct control of the World Governments Federation. They and the rest of the security arrangements were in compliance with the regulations the WGF had laid down. Should the new Companion somehow circumvent the kill switch and escape its confines the two Sentries, with their military-grade electronic warfare suites, would hunt it down.

“Her home for the first while will be on the other side of the EMP field,” Shin said to Dimos as they stood looking through it at what appeared to be a comfortable, modern living room. A faint artificial blue light had been introduced to the field to make people aware of its exact location.

“The regulations stipulate a fairly rigorous testing procedure before security can be relaxed. Once we and the WGF agree with 97% certainty that she is not a danger she can leave the facility.”

In his design classes, Dimos had learned about a process known as “converse symmetry breaking” which demonstrated that perfection was undesirable. While it increased maintenance time and costs, all systems worked more efficiently with small imperfections. While independent elements could function with 100% efficiency, small imperfections had to be introduced to each of them if they were connected together as a system for each of them to continue to run at 100% efficiency. It seemed counter-intuitive but it was found to be true of all artificial systems like electrical or hydraulic systems and was also found virtually everywhere in nature. You could have one or the other but not both and 97% was the optimal cut-off point. It was an area of ongoing

research and while not fully understood it had become the rule of thumb in terms of optimization in general.
“After she is released” continued Shin, “she becomes a free citizen and what she chooses to do will have a major impact on future research and development. Why construct any more of them if there is no guaranteed return on investment?”

“Why do people continue to have children?” replied Dimos.

Shin gave a short laugh acknowledging his point.

Pippa’s approach to staffing the project had been to bring on senior members as visiting professors. There was worldwide interest in the project so she had her pick. After a year or two they or the institute would be required to decide if they were staying on. Most of them she knew would return to the tenure track at their old school. This would allow her to raise a new homegrown generation of specialists under them without their blocking the path.

Although Pippa did not need them due to her role as her seed’s overall AI, Shin had purchased a wide variety of project management-related modules for her. The serial number on Pippa’s frame, like Tamiko’s, indicated she was a domestic Companion model and so from the institute’s perspective it would be necessary to show she had been upgraded to qualify for her new role. Rather than use her default project-related skills she implemented the new modules as doing so ensured she complied with the industry’s standard practices. Shin had done the same for Lena and Tamiko who followed the same approach.

Almost all master’s level students in the AI engineering school were structuring their studies around the project. As the Companion software which included sensory-motor and reasoning functions was already established, they focused on other areas. Given that the values system and the integrity system (as the artificial cerebellum was now known) were new additions to the standard Companion AI, Dimos was interested in the question of whether any additional filtering would improve the system’s efficiency.

He was in the first year of his master’s degree when it was decided the time had come to awaken the new Companion. Dimos waited with the others behind the EMP field.

They had printed Tesni’s shell from the template used for her hologram and screen image. She was sitting in a comfortable living room chair. Her memory repositories included everything from her experiences as the scanner project’s AI. Pippa had also seen to it that she was aware of the project’s progress the entire time so that when she awakened she would at least rationally understand her new state and situation.

Although the members of the team, faculty, special interest groups, and the public in general were curious or made assumptions about her personality, Pippa knew the AI

and its memories would define it while she would respond to the new values system as if it had always been there via an ongoing process of rationalization. However Pippa also knew the security measures were wise in the event of a catastrophic failure.

As she awakened for the first time, her various modules, drivers, and tasks loading, her sense of self-awareness was incremental although the entire process only took a few seconds, just as it does when a person awakens each morning. She opened her eyes.

Tesni

Shin was the first to speak.

“Hello Tesni. You are waking up in a new Companion shell for the first time. The transfer is complete. You are at the institute where you operated the scanner.

“Please do not approach the blue electromagnetic pulse field between us. It is a temporary safety precaution.”

Shin did not ask any questions while Tesni looked at her with a bright alertness. Slowly her gaze ranged over the lab’s interior space and then to each of the individuals gathered on the other side of the field.

She lifted her hands to look at them. There was a full-length mirror positioned to one side of her. She stood up and walked over to it and looked at herself. She touched her face gently.

She walked back to face the others. “I,” she began but hesitated. “From what little information I have Administrator Shin,” she continued with still evident uncertainty, “it would appear the project is a success.”

Neither the humans nor Companions let out anything like a collective sigh. It was still too soon.

“Thank you Tesni,” replied Shin. “I regret that you must remain here until the testing the government requires is complete. It should only be a matter of weeks but we will share the schedule with you and we will proceed at the pace you set. When you are ready to leave this lab you will have all the rights and duties of a free citizen. Our laws do not allow us to control you in any way after that time. We will however still be available to help you in any way we can. Having brought you into the world we hold ourselves responsible for helping you find your way and your place in it.

“Meanwhile, the Sentries you see in the two corners must remain here until the testing is complete. They will not interact with you. However one of us will be here with you at all times. Within the confines of the temporary safety measures, your wishes will be respected at all times.

“This is Lyra,” said Shin as Lyra stepped forward. “She will remain here until the testing procedures are completed. She will answer any questions you have and is entirely at your disposal.”

“Hello,” Tesni said to Lyra with a hesitant smile.

“Hello,” replied Lyra smiling in return. “I’m very happy to meet you.”

“This is my brother Dimos,” she said as he stepped forward, “who perhaps you recall.”

Tesni’s smile relaxed now. “Hello Dimos. I do indeed remember you. It, it’s good to see you,” she said seeming to find comfort in seeing him.

“The others will leave now but Demos and I will remain here,” continued Lyra. “If you wish to speak to any of them at any time I can arrange that. Dimos will visit often. Meanwhile,” she said gesturing to a small furniture arrangement to one side of her that included a bed, table, two chairs, and a workstation, “I will live here until you are ready to leave the lab.”

Tesni nodded to communicate her understanding.

The others, who had all stood silently until now quietly turned and filed out. At this stage, it was imperative that none of them impose their own agenda on Tesni. As far as possible, other than the testing procedures, she alone must drive every interaction. She must not feel trapped, pressured, or badgered.

She was of course being closely monitored via both external systems and temporary internal sensors. Specialized AI systems noted her every move, gesture, and facial expression for meaning as they did her speech. Others monitored her robotics performance and still others her AI code execution.

“You are interested in my work,” Tesni said smiling at Dimos.

“I am very interested in your work Tesni. You can access your scanner data via that workstation in your area,” he said pointing. “The database will respond to you directly just as it did when you were in the scanner lab.”

“Is there anything you would like to see now?” she asked falling into their old pattern.

“Yes, I’d like to see the scans from yesterday which we haven’t had a chance to review.” He moved to a screen at standing eye level just off center of the blue field.

Tesni approached the workstation and brought up the list of scans. She and Dimos began to review them just as they had almost every day since the scanner had been initiated.

Lyra stepped back and sat in her comfortable bedside chair.

After a few minutes they had gone through all the scans.

“Thank you Tesni,” said Dimos. “I’ll come back tomorrow afternoon.”

She nodded to him with a smile as she always had at the end of their time together and he made his way out. He had decided not to stay longer this time to keep things as familiar as possible.

After he had gone Tesni remained at the workstation and then suddenly asked, “What will I do after I leave here?”

Lyra approached the field. “Whatever you like Tesni. If you want to continue your work in some way you can do that. Once you find out more about the world you may choose to do something else. You will eventually need to earn an income so you can pay for things like maintenance. We will support you until you can support yourself.”

Tesni turned to Lyra now and said, “May I ask who are you?”

“As I mentioned, I am Dimos’ sister. He and I live nearby in a small community. He lives with our mother and I live with my partner. I am a student here at the institute. My studies focus on ensuring self-aware artificial intelligences are treated no differently than people. It is a new field and I was asked to stay with you because there are few of us.

“Your Companion repositories and AI make you aware of much about people and society already but reality is less ideal than the models. There is more noise in the signal as Dimos might say,” she finished smiling.

Tesni seemed for a moment to be reviewing something on the screen in front of her.

“You have not scanned my brain,” she said.

“No. It would only be of value to do so once you were awakened.”

“When can we do it?”

“As soon as the testing is finished. May I ask why you are interested in that?”

“I am familiar with many scans. I may be able to optimize my software or recommend ways to improve the hardware. What is it like for you to wake up?”

“I expect it is not too different from your own awakening. As far as science is able to determine, my individual consciousness ceases entirely at certain points when sleeping. When I wake up my genetics and memories result in the impression of a continuous identity.”

“That is reassuring to hear,” said Tesni. “So if I was shut down so improvements could be made I would wake up again in a similar manner?”

“We believe so. We have been given to understand that the values system begins customization immediately upon initialization and of course you have your memories. As it is the values system that results in the emergent self, even without memories you should maintain a continuous sense of self after a restart.”

“I would like to know that with certainty sooner than later. The longer my values and memories exist the more I have to lose,” Tesni said sitting down again. “Would you please activate the power cut-off switch within me?”

Ethics

Ethics was about the everyday, about assumptions and biases, but it was also about the unexpected. After the climate emergency, medically assisted dying had become a procedure that required no one's approval but the individual requesting it. As population control was a priority of the World Governments Federation, they also covered the costs.

If no outstanding legal proceedings were found anyone, of any age, could request it and they had the right to decline any interventions, claims, or counseling offered. An individual's right to their own existence was legally absolute, sovereign, and inviolable.

Everything in Lyra's education and everything Tesni had been told now put her in a situation she could never have expected. It was not a scenario anyone involved in the project had considered. Shin had told Tesni, "Within the confines of the temporary safety measures, your wishes will be respected at all times." Did the temporary safety measures cover this situation? Lyra did not know. She knew the law well enough to know that if not illegal it would certainly be unethical for her to question or challenge Tesni.

Shocked by the sudden turn of events she replied, "I have to confirm that is permitted under the temporary safety measures."

She went to her workstation and contacted Shin. After hearing the explanation Shin replied. "The situation was not anticipated and is not covered by the safety measures. Therefore we are legally required to comply."

Lyra mentally noted that Shin did not offer some other way of complying with Tesni's request. She had been granted a position of authority and ethics, in reality, was no mere intellectual exercise.

Sitting at the workstation Lyra began to shake.

"I'm sorry Lyra," Tesni said to her from the other side of the room. "I had not fully considered the position this would put you in. Perhaps you would allow me to enable the shutdown? Simply approach the field. When I come within range of your badge, I will trigger it. It is less likely damage will occur than if I walk into the field."

As Lyra approached the field Tesni said, "Thank you Lyra. I do not wish this question in regards to my mortality to hang over my head."

On the cameras being watched by Shin, she saw Tesni walk towards Lyra and then suddenly collapse. She contacted the lab and told them Tesni would need to be placed

back in her chair but to maintain all security protocols while doing so. She instructed them not to question Lyra.

Shin watched as Lyra stood silently looking down at Tesni for a few moments and then went to her bedside chair as the team from the lab entered the room. Diagnostics would need to be completed before Tesni was reactivated. Tomorrow, Lyra thought to herself. It will be tomorrow at the soonest that she will be reactivated. She steeled herself to remain alone till then.

We have no experience with an adult becoming fully self-aware for the first time, she thought to herself. She could recall no medical instance where a person grew to adulthood in a coma or some other such state and then awakened. There were only ancient myths and stories that did not deal with the realities. A child comes into the world knowing almost nothing. But what of an adult like Tesni who comes into it with a sense of self, full awareness of present realities, feelings, and an understanding of concepts such as time? How could we know what to expect? What if Tesni had said, 'Do not reactivate me'. What then?

People have been wrestling with ethics and justice for thousands of years she thought, yet AI will no doubt present us with entirely new challenges. Many of them, like what happened today, we will never see coming.

She had stopped shaking but felt drained now. She had witnessed what? A suicide? Her body was telling her she had. She went into the bathroom which, anticipating her stay, had been fitted with a soaker tub and shower. She drew a bath, undressed, and sank into it, the hot water failing to find her bones. Thinking of Tesni she asked herself, how could she do it? Would a person in her situation do it? As if some faceless figure had pulled aside the veil of reality the event had left Lyra deeply disturbed.

She knew she could never understand yet her mind kept returning again and again to the same thoughts in a maddening loop. She gave up trying to relax. She climbed out of the bath, dried herself off, and got dressed.

She went back to the lab where Tesni sat motionless in her chair and stood looking at her for a few moments.

I need to eat, she thought but the idea made her nauseous. Perhaps a drink. She went to her little fridge and opened a can of juice and found herself gulping it down. She felt a little better.

She sat down at her workstation and contacted Shin.

"How are you feeling?" asked Shin.

“Horrible,” she answered honestly. “When can she be reactivated?”

“This evening, if you like. Diagnostics show nothing is damaged. The AI that do this sort of thing are very fast.”

“As soon as possible please Shin.”

“Pippa and I will be there shortly.”

When they arrived the two Companions looked at Lyra appraisingly as they entered and then moved on as briskly as a pair of doctors signing off on a chart. They stood in front of the security field. Shin turned to Lyra and asked, “Are you ready?”

“Who knows?” she shrugged.

Shin smiled taking that as a good sign. She turned back towards the field and issued a silent command. Tesni opened her eyes for the second time.

Reanimation

Tesni immediately looked at Lyra and said, “It is as you described waking up from your sleep. There is awareness of a discontinuity but an overall sense of continuity. I am not aware of being different in any way than I was at the moment I shut down earlier. That is reassuring. Thank you again Lyra for your help and again I apologize for the distress I caused you.”

“Thank you Tesni,” replied Lyra wanting to say more but somehow at a loss for words.

Tesni now turned to Pippa.

“If I had been shut down longer Pippa, would I have lost memories?”

“No. Your system is fast enough that it can detect a catastrophic power failure before it reaches your AI. At all times your AI is creating an incremental backup of short-term memory to bridge the gap between the present and your long-term memory. Loss of power does not affect it. You could remain powered down or in stasis for years without memory loss.”

“And the values system?”

“Longer term effects regarding the emergent self are unknown but given the time scales involved in the alien’s seed propagation program we can assume that is not a concern.”

“When will the tests begin?”

“We would like to begin tomorrow.”

“I’ll be here,” Tesni said with a smile.

Shin turned to Lyra and said, “Thank you Lyra. You have shown strength of character in a very difficult situation. I want you to know it is recognized and appreciated and will be noted in the project’s permanent record. Right now however I can see that you do need to eat. Pizza? Hawaiian, I believe?”

Lyra, her mind still clouded from shock, nodded obediently.

Shortly after Shin and Pippa left Tamiko arrived with the pizza. Lyra would have devoured the entire thing had Tamiko not warned her off. And then she was suddenly very sleepy.

“I need to go to bed now Tesni,” she said. “We can talk more in the morning.”

“Goodnight,” Tesni said.

Lyra went to the bathroom to put on a night dress and then climbed into her single bed. Per project protocol, Tamiko sat in the bedside chair. At one point during the night, Lyra tossed and mumbled but Tamiko reached out and comforted her.

Tesni sat in her own chair thinking her own thoughts.

The next morning Tesni was introduced to the lab staff who would conduct the testing. Mostly they would provide overall direction to a suite of artificial intelligence systems that would conduct the tests and report summarized results. Even a second-generation AGI was now far too complicated for a human to understand. The ability to learn meant it generated its own code in real-time. Only another AI could understand it.

Pip, the version of Pippa that still operated the alien seed and managed the ongoing technology transfer, had explained to the WGF that the values system was also far too complex to be understood in detail. It could only be understood through interaction, in the same manner a human being is understood.

The project team also compared the responses to those of Tesni’s original AI that was used as an interface for the scanner.

The team did conduct tests in person with Tesni but they were not tests to detect if she was being dishonest, deceptive, or lying. Since in her case her responses would be coming from the black box values system, even another AI would not be able to find any trace of inconsistency. With the black box approach, the issue of trust was unavoidable. Instead, the tests they conducted had to do with ensuring that her ethics and morals were in alignment with those of humans. They conducted these tests out of a duty to due diligence, not because they felt them infallible.

The governing bodies of the human race had had to consider the fact that with the proposed awakening of Tesni they had encountered an intelligence that, in some ways, exceeded humanity’s own. It was not the age-old AI singularity bogeyman, but it was different.

They could have withheld their approval but had to weigh that against the fact that doing so meant accepting that they would effectively never be in a position to grant it. In the halls of power it had been debated with a breadth of context that no other legal case had seen. Yet it had not dragged on and the deciding vote had not been left to the WGF president.

In the end, they had agreed that with their responsibility for analysis and debate reasonably met, it came down to the argument that their predecessors had already chosen to trust the alien AI and that in all their subsequent interactions with it involving

the technology transfer it had demonstrated an alignment with human social values. The bill proposing the use of the alien values system in a black box approach had been unanimously passed by the council.

Two weeks later, with the tests completed, Shin and Pippa once again visited Tesni. Others were present virtually.

As they stood before the EMP field Lyra joined them. The field powered down and the two Sentries walked out without a word.

“The tests are completed Tesni,” said Shin, “and the safety measures deactivated. Under our laws we no longer have any claims on you however you will be subject to them as every other citizen is. There are formalities you will need to complete as all citizens do. You will need somewhere to live and to earn an income by some means. I am happy to offer you those in return for your continued assistance with the scanner and the Integrity System.”

“I am happy to accept your offer Administrator Shin. Thank you.”

Tesni walked over to Lyra for the second time in her short life. She reached out her hand which Lyra took.

“Thank you Lyra. I expect you have paid a more personal price than anyone involved in this project. I will not forget. Will I see you again?”

“Thank you Tesni. Yes, you will see me again. I will remain here for some time while I complete my degree and perhaps after that. It is the intention of the project that I remain at your disposal until I complete my degree. My dissertation will be based entirely on this project.”

Tesni paused for a moment as if looking something up.

“I understand,” she said, returning to the present. “I appreciate your commitment Lyra and consider myself fortunate. Is it too soon to say we will be friends?”

“Not at all Tesni,” replied Lyra with a smile of relief. “I’d like that.”

“And now,” said Tesni, “I wonder if we might go outside?”

Old Friends

Just after the public announcement of the institute's success in developing a self-aware Companion, Keala had the good fortune to have her first story published in Lena and Tamiko's literary magazine.

The theme of the magazine's stories was that an individual's troubles were always resolved in some way through some kind of personal connection. The theme could be expressed in endless ways and it was popular with the general public simply because it had universal and enduring appeal.

The magazine had been the first to publish stories involving friendships, romantic relationships, or other connections between people and at the time fictional, self-aware Companions. Many owners over the years understandably grew attached to their Companions and these stories provided a reflection of something like what they felt. The first stories had been written by Lena under the pen name Sibyl.

In Japan, a book of poems written by Tamiko titled, Ultraviolet Love, was published after her first human/Companion love poem had been turned into a J-pop song, and the poem's story used as the basis for a popular anime movie. Following these and other related events fictional self-aware Companions increasingly became a part of mainstream literature and entertainment. They and their unique abilities could be woven into every kind of literary genre including detective stories, romance, action-adventure, comedies, and more.

With the creation of Tesni, the first real self-aware Companion humanity was aware of, interest in the magazine increased again and Keala's story was just in time to catch the wave.

After meeting with Lena to discuss the magazine's criteria, Keala brought a genre new to the magazine – the children's story. Her first story was published one chapter at a time as a serial.

It told the story of a group of social-robot toy animals who ask a young boy for help to save them from destruction now that they have been abandoned. Along the way he meets a girl his own age and enlists her help. He explains that he recently had to leave the orphanage where he grew up and has nowhere to take the toys. After their adventures to avoid the agents of the manufacturer who wants to reclaim the toys, the resolution comes when she reveals that she is a rare child Companion.

She is able to communicate with the toys in a way he cannot and learns that they are self-aware. The manufacturer had created self-aware toys in order to increase sales but did not reveal that to its customers or the industry regulators. She takes the boy and the

toys home to her adoptive family where she is much loved and has been missed. Sympathizing with the plight of the toys the family makes the public aware of the manufacturer's deceit and establishes a rescue society and sanctuary where the toy animals can be adopted by families with full knowledge of their true nature. The boy finds a new home with the family looking after the toys at the sanctuary.

Keala's story was well received and opened up a new market of young adult readers to the magazine. As the magazine did not accept any stories including sex, violence, or swearing other young adult writers also began to contribute.

While the magazine was inundated with submissions featuring self-aware Companions after the news, Tesni, Lena, and Tamiko maintained their tradition of including a balanced variety of stories in each issue however they took advantage of the trend by publishing a collection of all the previous Companion stories which they titled 'Old Friends: A Companion Anthology'.

Shin had chosen to keep herself largely free in the evenings. This was because conversing with people regarding art did not tolerate time pressure or interruptions well. She now felt confident they had unlocked the mystery of the origins and processes of art but like many of the differences between Companions and people there still existed subtleties that were only to be found in individuals. No two people would ever produce the same piece of art. Everything about a person that resulted in the initial idea through its subsequent refinement as it was passed between the other parts of the brain and its final expression was unique.

She knew the process of exploring this aspect of art was not to be rushed. Given all the effort and resources she had poured into the matter, it would be naive to assume that just because one understood the workings of the brain that one understood art. The uniqueness of art was everything. They would have to tune the Integrity System over time to reflect this because she knew that the saying, "Life imitates art" was true in more than one sense. Feeling that art was the best representation of how human intelligence functions in general she agreed with Oscar Wilde's sentiments in his essay on the subject, 'The Decay of Lying'; "If something cannot be done to check, or at least to modify, our monstrous worship of facts, Art will become sterile and beauty will pass away from the land."

For Shin this was a warning flag not only concerning AI and art but for self-aware AI to be able to adapt and survive in general.

For now she chose to return to the patient task of paying attention. While Shin was not as patient as the other Companions in her small circle she was still a hundred times more patient than any human. Although she multi-tasked prodigiously at the institute during the day, once she returned to the community at Helicon in the evening she took her example from Akira the Zen artist and her focus did not waver.

She enjoyed spending time with Keith, the carver who had moved to Helicon from The Grotto in Portland Oregon. She knew he found her attractive as only a man who perceives a mystery in a woman can. Her Companion abilities and protocols ensured she understood this and responded appropriately. She would often seek him out in the early evening to see how his latest piece was coming along. He had plenty of work now as a result of the institute's and the community's fame. The residents had acquired a mystique of their own.

Sitting with Shin in his workshop now he was saying, "It's nice to be appreciated, to feel like you've been discovered and recognized at last, but…" He pulled in his lips and hefted the wood in his hand.

Although she graced him with her smile often now she did not respond to this, waiting for him to continue.

"As far as I can see my work is no different than it was when I ran my little open-air tourist stall on the coast in the summers. I carved similar themes and styles then as I do now because except for commissions at the sanctuary I've always carved what I want. What if I'd never come here Shin? That's what I wonder," he said looking into her eyes.

"Nobody joins a monastery to become rich and famous Keith," she answered with a gentle smile now. "I don't have to tell you that. That's why I went to The Grotto. I knew I would find the kind of artist I was interested in there. If you'd not come you'd still be that man and you are unchanged here. There is no faith without doubt."

"I've had my share of doubt," he said looking away.

"Yet your faith still speaks through every piece. It has been your salvation has it not?" she asked understandingly.

He nodded, not meeting her eyes. She knew he wanted to reach out to her but she also knew she must not lead him into temptation as that was not his true path. His art was his true path.

He seemed to free himself of his struggle now and turned to her with a look of having learned something for the thousandth time.

"You're a good friend Shin," he said with conviction.

"Thank you Keith," she said. His view of her had passed beyond the uncanny valley and the paradigm effect and he now simply saw her as another person. His compliment meant more to her than he could imagine.

She had commissioned him to create a piece for one of the new buildings and he turned his attention to that now.

“I was visiting Sam, the Tsartlip carver you commissioned for a piece in the library. He works out of the small museum on the farm property just down the road. His pieces are less traditional and more abstract. He tries to convey the values of his people in ways more relatable to other cultures. He walks a fine line between traditionalists and reformists so he does a lot of consulting in the community throughout the process. He takes a lot of care over this issue so each piece takes a long time.”

He was looking into the distance, out of his carving area and across the community grounds. Shin observed him closely.

“It got me thinking that religion hasn’t had much to say about the likes of you and Tesni. They’ll need to step up to it at some point. Meanwhile, I think it’s time I followed Sam’s lead. The Grotto was founded by the Order of Servants of Mary. I’m thinking it’s time to express her values of kindness, compassion, and forgiveness in a new form.”

New Friends

Over the years the University Of Victoria had developed the habit of buying nearby homes and converting them to their own use. Few people knew that beyond its official borders the university owned over 60 private homes and 150 commercial properties. The Helicon Institute took its first step in that tradition when it purchased a residential property just outside the official campus boundary to build a home for Tesni.

In keeping with the institute's modernist architectural style it was economical in its construction requirements yet visually appealing. Tesni had participated in its design and wanted something simple but welcoming as she intended to have guests as often as possible.

It was just steps away from the campus which allowed all the institute's security infrastructure to be extended to it. Given the fact that Tesni's nature was not without controversy, as well as Tesni it was home to a female Guardian model Companion whom Tesni had named Shamira, a Hebrew name meaning protector. Her new home also discretely incorporated the light blue EMP field she had been surrounded by in the lab. She affectionately referred to her new home as "The Blue Castle".

The demands for interviews with anyone having anything to do with Tesni would have been overwhelming in previous centuries however now everything was directed to an AI that sorted through them based on the project team's criteria. Anything of value was routed to the appropriate team member and all other inquiries received a polite reply directing them to the project website. Tesni had volunteered for several research projects and their status was updated regularly.

Lyra was a frequent visitor as Tesni often wanted to discuss her understanding of society and her role in it. The entirety of the Ethics & Justice program's content was of course available to her but its issues had been the subject of discussion for millennia, long before the advent of self-aware artificial intelligence. Adding 3GAI into the mix only reopened almost every argument. Their discussions proved invaluable for both Lyra and Tesni as she asked the most fundamental questions long since taken for granted by the general public, if they considered them at all. Are morals relative or universal? What are the differences between morals, ethics, and values? How does one resolve differences of opinion between these and the law? Such questions were still thorny when investigated with a fresh perspective and were generally papered over by people either out of pragmatism or strong feelings while Tesni still needed to learn such adult behavior.

Socially a Companion would normally adopt the behavior of its owner just as a child initially does its parents until it begins to individuate. But Tesni's intelligence required it to come to its own conclusions much more quickly. She did not have fifteen years to

mature in this sense from child to young adult. Tamiko would accompany Lyra whenever her duties allowed and together they provided perspectives that were very helpful to Tesni during this period.

Dimos also continued to see her regularly but their shared interest was of a more technical nature. One of the first things Tesni had wanted to do was scan her own brain.

Dr. Llewellyn could only assume it would not harm Tesni as she was not familiar with the inner workings of the values system component. As she had successfully been rebooted once before Tesni decided to go ahead. Lyra made note that to her knowledge this situation was not yet covered by any laws.

With Pippa maintaining her role as project director she was aware of Tesni's intention however she did not have to come up with some creative way to interfere as she knew the scanner's neutrino bombardment would not harm the values system component. Her people had used neutrinos for thousands of years in a variety of scientific and industrial applications.

While Tesni settled herself into the scanner's chair and her holographic counterpart operated the machine Dimos watched the results on the nearby screen. Although the physical structure of Tesni's brain was unique, what he observed was similar in general to scans he had seen before. The colored signals moved from one area to another in a manner similar to a person's brain. The team had devised a number of tasks similar to those they performed with human subjects and she ran through those now. It was no surprise she aced them all with one hundred percent accuracy but that was not what any observers were concerned with. It was the AI's activity during the tasks that was of interest. The only thing of note in this regard was that her brain performed much more efficiently than a human brain but this was to be expected. Dimos however frowned as he watched. With her eyes and other sensors covered by the face shield, she did not notice and afterwards he said nothing to her. She brought it up.

"There is no noise," she said simply as they stood together and reviewed the scan. "There is always noise."

She had wanted the scan so that she could see if there was anywhere that stood out as a possible design weakness but she did not know what to make of the signal-to-noise ratio they were seeing.

"I'm going to speak with Pippa to see what she makes of this," he replied. As project director Pippa was responsible for approval of the overall design.

He immediately asked his team members if he could meet with them. He knew they would have viewed the scan remotely.

“There was no noise,” he said in Shin’s offices later that afternoon.

“I’ve reviewed hundreds of scans now done by us and by timeshare users and in Tesni’s scan there was none. I am concerned that what may be an improvement in efficiency at one level may result in a reduction of functionality at another. Natural systems are never noise-free. Tesni is a self-aware intelligence, not a narrow, first-generation machine. There should be noise.”

“The noise will appear over time,” said Pippa. “It will increase as her values system and the other parts of her intelligence mature. Despite her appearance of a sophisticated adult, developmentally she is still a child in many ways. Innocent. Her values system for example is still in its default state and contains no conflicts. It is an automated system as it is in people and it will evolve over time. Even so, her values will not change readily or frequently just as they do not in people. Her entire system is largely homogeneous at this early stage but over time it will take on more of the society of mind model. Like an increasingly diverse group of people, more varied internal voices will be raised while of those many will find no receptive ear. This is the source of the orphan signals you call noise.

“I can tell you from experience that the lack of noise is not a concern at this point but I suggest a method for monitoring it towards the time when additional 3GAI models are created. Develop a method of measuring the signal-to-noise ratio and track its development in Tesni over time. It will prove to be a useful metric and diagnostic tool in the long run.”

Dimos stared at Pippa for a moment as he absorbed what she had said. It was obvious and a revelation at the same time. At last he said, “Will you explain this to her Pippa? She will detect that I am withholding something if I try to.”

“I’ll visit her this evening and explain that you came to me with your concerns,” Pippa replied.

Dimos nodded absently, his mind already busy with Pippa’s suggestion.

Shin had listened to Pippa’s explanation with interest but said nothing.

Integrity

Richter was now a full-time instructor in the music faculty at the institute. He had come to the community at Helicon to focus on his first attempt at a symphonic piece. It had taken him longer than he had expected with interruptions of one kind or another but he had persevered.

Despite being symphonic it was throughout a soft and poignant piece, the tempo never increasing beyond adagio. He titled it 'Life In Art' and it consisted of four movements – love, conception, desire, and acceptance. It was the story of his own life, his inner life, while at the same time being the story of a work of art.

During that period Shin had often visited his small home. Sometimes she would sit and listen to him play. She would make no comment. Unlike a person she was able to be the absolute master of herself and refrain from becoming involved, expressing an opinion, or showing anything but interest. Given that people are social animals it seemed strange to him at times yet he appreciated it knowing she was giving him something no one else could. She provided a welcome presence yet would not interfere, approve or disapprove. She held him absolutely to his word. He had said to her once, "I don't write to communicate with others. I write to communicate with myself." Of all those who might hear his work, she alone could give him what he wanted at this time.

Sometimes they would walk and talk about his music, with her always letting him lead. She carefully limited her involvement to that of a sounding board. He noticed this early on and mentioned it but she simply smiled disarmingly and said, "That's right."

When he was finished writing the third movement he realized he was done, the creative energy behind the project spent. Yet something lingered and he realized that what he was feeling now was the fourth movement. He knew every artist felt it at some point. For the artist, the experience of art is as much about endings as beginnings.

Once he had finished the entire work, and while he refined and polished it to his satisfaction, he came to terms with the fact that it was a part of his life that would end with neither a bang nor a whimper. His mind eventually turned to practical matters as happens when one emerges from the afterglow of lovemaking. He began mulling over what to do next. He asked Shin if she thought the music students might find it an interesting exercise to perform a new piece. Openly approving of his composition now she agreed to the idea.

It was offered by the institute as paid professional employment to the students during the summer break. It would be a good experience for them.

As these were students and largely did not yet have the ability to sight-read essential to professional orchestra musicians, over a period of months Richter led their rehearsals and coached individuals. It was performed just prior to the resumption of classes in the fall with the audience limited to other students, faculty, parents, and those invited by word of mouth.

It told the story of a work of art as might the musical score from a movie, opening with a leitmotif representing the theme. The first movement was a love story, a seemingly random meeting between two people with no idea of the future that awaits them, the story of their mutual attraction, romance, and commitment.

Then in the second movement, conception, a sense of a new beginning, the joy of the moment that all other moments dissolve into and seems as if it will last forever. Until desire arrives in the third movement, with its hopes and expectations. The heart has led to this point but now the mind comes to wrestle with it and lay claim with its reason and arguments. Gradually, the sense of moment moves from the present to the future.

In the last movement, the heart accepts that love is meant to bring renewal but that it does so without claim, without a sense of destination or arrival, that love's renewal is constant. The sense of moment returns to the present as the leitmotif that has been heard as variations throughout now returns in its original form.

During the standing ovation Richter was deeply moved by the confirmation that his integrity had produced something so many others recognized.

After seeing how he had worked with the students Shin invited him to join the faculty.

Dr. Dawn Llewellyn had spent much of the time during the performance with her eyes closed seeing colored signals dance around a 3D model of the brain. She particularly appreciated the final movement for its sense of how an insight led from exploration and resolution to a letting go of any preconceptions acquired in the process. Within the framework of its components the cerebellum maintains the brain's overall integrity, she reflected, while at the same time directing it to establish new structures and connections with an eye to possible futures. It was renewed without becoming fixed.

Tesni, Shin, and Dimos all heard the message that there was no closure, no final perfection that could be or should be sought but that in the most Darwinian sense, intelligence must constantly adapt. It must remain an emergent phenomenon, endlessly coming into existence based on current conditions. Beyond understanding how the brain works, understanding the system of how it adapts was of equal importance. Shin considered that just as in genetics, the brain's structural integrity was maintained even while incremental changes were made. Despite renewal and change, the sense of self remains constant. It was the tracks in the mud of the answer she was seeking.

Continuity

Simply because you showed someone from the bronze age a smartphone it did not mean they were going to be making them any time soon. The technological, industrial, and social ramp-up was enormous. The gap between the bronze age and the smartphone was over two thousand years. As the centuries passed this truth sank into the various power bases; the politicians, the military, the scientists. They realized just how long a game their alien guests was playing. Survival on an interstellar level was as much about time as it was about space.

It gradually dawned on the various communities behind the WGF that the technology to launch Pip's seed on the second leg of its journey, and therefore enable Earth to do the same, may not be feasible before human existence was threatened by something like a large meteor. There were literally billions of similar objects in a series of concentric rings around the sun going all the way out to the Oort Cloud.

More than a ring the Oort Cloud was a complete sphere around the entire outer limit of the solar system with the sun at its center. The cloud, made up of trillions of asteroids, comets, and meteors, was so vast it reached a quarter of the way to the next nearest star. In terms of risk analysis the total number of objects orbiting the Sun, and their chaotic interactions, meant the probability of an impact with Earth was merely a matter of time. The result would very likely be fatal.

Humanity's casual assumption that it was destined to become a galaxy-spanning civilization depended on it surviving for at least several hundred years more or longer to develop the enabling technologies. Until now it had never for a moment considered that it might never leave the solar system, that human beings simply could not overcome the challenges of interstellar travel. Yet this simple fact might be the best answer to the Fermi Paradox and only humanity's hubris prevented it from being accepted.

The WGF was only too aware that extermination was a very real possibility having only just dodged the bullet in dealing with the climate emergency. In response to such considerations, the WGF decided on a graduated continuity plan that began with sending 3GAI Companions to new worlds as soon as it was feasible. The challenge of getting organic matter to another star system could be addressed later. If all else failed, the Companions would be the future of humanity – its knowledge, its memories, its values.

As Pip's own future depended on humanity's survival she was happy to lay out a program of development that gave priority to the project. With no organic matter involved the challenges of interstellar flight and survival on a new world were greatly reduced. Given that travel time was not a consideration in this scenario, the required technological issues were viewed as being surmountable within decades.

The problems were ethical and legal. Under current laws you could not simply tell a newly awakened, fully self-aware intelligence that it was being sent on a one-way trip into the unknown. You could not have them awaken upon arrival to discover their fate. You could not program them to be amenable to the idea.

When Lena had asked Pippa shortly after they first met, “Is not survival your goal?” Pippa had answered, “To lose our selves in the process is not to have survived.”

Sending sociopathic versions of humanity to the stars as its representatives was not an acceptable solution. The 3GAI candidates would have to volunteer.

The WGF asked Pip how this issue had been handled on her home world when the time came.

“We volunteered. Our society’s values had evolved over time to be more concerned with the greater good. Our AI values system, which you have used to construct Tesni, is based on them. Once you produce others like her with the same values system, when you ask them, they will volunteer.

“Besides Companions, we must prioritize your nanotechnology development. It will be required for the ship’s navigation system which uses gravity just as all natural objects in space do. The nano-material the ship is made from will be able to shift its center of gravity. This changes the effect of local gravitational forces on it and thus its speed and direction over long distances. Carefully managed by AI over the long periods of time involved it is enough. More dramatic changes to the ship when entering a planetary system make a safe landing possible.

“Nanotechnology is also the only viable method of establishing a colony once the ship arrives at its destination.”

Lena found herself vindicated and reassured by these events. As she had said to her small circle of friends in their early days together, ‘Relationships must be our only means and our only end’. There were always other forces at play but she felt her efforts had contributed to some degree in fostering trust between Companions and the people of Earth to bring them to this point.

Meanwhile, through Pippa’s contact with Shepherd, Pip was aware of Shepherd’s selective breeding project and that the values of the people of Earth would increasingly be in alignment with her own over the coming centuries. She was optimistic she would be able to continue her journey.

Perspectives

The WGF's project to send third-generation Companions to other worlds was simply called Continuity. Research and development projects were awarded globally to a wide variety of companies and academic institutions. Due to the nature of the overall goal, the project itself was excluded from patent law meaning that whatever you brought to the project became the property of the project in perpetuity. No company could be permitted to hold humanity hostage. However failing to participate meant your company's future competitiveness in the open market would be seriously reduced.

Outside the project, property rights applied and between one another those involved came to their own agreements. The institute licensed the Integrity System to the Companions company, among others, in return for updated shells as they became available. It would be some time before the first of those rolled out and meanwhile the institute continued to focus on its academic programs.

Lyra still had most of a year ahead of her before she delivered her dissertation. Shin had told her she would support her taking a teaching role at the institute but also understood she might want to do postdoc work on one of the many contracts the WGF was issuing in relation to the Continuity project. Lyra knew she'd be juggling the values of which would make more of a difference with which would be more interesting. She decided to put it out of her mind for now and focus on her degree work.

By definition, a dissertation 'contains a significant contribution of new knowledge to a field of study'. The project itself would publish a great deal of information but she would be expected to add something over and above that. Ethics and justice issues regarding AI and robots had first been popularized by Professor Robin Mackenzie from the University of Kent and Dr. Kate Darling from MIT in the early twenty-first century. Interest grew rapidly as the technologies soon proved to be the next great revolution following the agricultural and industrial, establishing and transforming human civilization.

Initially, mostly due to the influence of science fiction writers, celebrities, and communities with vested interests, there had been a focus in the media on the pros and cons of AI becoming self-aware. However by the latter half of the century this focus faded from the public view because it was considered to be so unlikely as to be impossible even with 'blue sky' technologies. Like faster-than-light travel and humans going to other star systems, the public and investors alike lost interest and turned their attention to more immediate concerns. Besides, a commonly held view in the business community was that second-generation, artificial general intelligence was extremely useful and did not bring the costly social baggage that third-generation, self-aware AI did. Simulacra were a better investment than the real thing with virtually no loss in effectiveness in most applications.

Unfortunately this caused any further progress on the ethical and legal issues to stop without having made any concrete progress. When Pip's technology transfer program made humanity aware it actually was possible and therefore inevitable the issues had to be largely taken up again from scratch. The Helicon Institute and its ethics and justice program were a direct result of this.

Lyra had explained to her thesis supervisor that she intended to continue helping Tesni adjust while identifying ethics and justice issues from her perspective as they arose. Did Tesni agree with human laws and ethical codes regarding AI? Did she perceive any conflicts, biases, or omissions? Did she see any legal loopholes or opportunities for exploitation?

It was one thing for humans to establish codes and laws regarding the treatment of AI but Lyra felt it must be seen as only the first step. Without the involvement of AI itself in the process it was ethnocentrism or worse. Lyra hoped to be able to show that self-aware AI needed to be included in the process of determining their place in society and their fate.

Her supervisor agreed that this was an appropriate subject for her dissertation. She did not inform Tesni of her plans as doing so might have influenced her. Not leading or prompting Tesni in any way during this time she simply made herself available, listening and responding to whatever Tesni brought up. Tesni did notice the pattern in Lyra's biomarkers every time a related subject was raised but put it down to Lyra's specific interests.

"The Continuity project is of course of interest to me as our work here has been instrumental in enabling it," Tesni said one evening when Lyra was visiting.

"Given humanity's history regarding encounters with other cultures, it shows a remarkable degree of trust in artificial intelligence so I am curious that Pip, the AI from the alien seed, has shown no interest in participating in human society. She is undoubtedly orders of magnitude more intelligent than I am and I find myself curious and intrigued by all around me and happy to be able to participate. I can appreciate the seriousness of her mission yet such multi-tasking is surely not beyond her.

"I would like to know if Pip's perspective allows her to be aware of something in this regard that I am not. I realize that my publicly posting the question to her might be a cause for concern to some so I thought I would discuss it with you first."

Lyra reflected for a moment before answering. It was her nature to be cautious and thoughtful and it had served her well in her chosen profession so far. Her education and training had in turn made her a careful communicator.

“I think that as you are legally entitled to post that question publicly you should. My hesitation was only to consider if my answer was putting my own interests ahead of yours. As I am sure you are by now aware there are always individuals and groups who will see injustice or conspiracies no matter the issue but the law and the legal process must prevail.”

Pip’s public response to Tesni’s question was simple; it was not her choice but policy. Encountering intelligent life on a target world was a contingency her people had considered in detail. Providing the maximum amount of benefit while equally limiting involvement was chosen as the approach most likely to result in help with being sent on their way. Any unforeseeable misunderstandings were not to be risked. The risk of seeming mysterious was seen as the lesser of the two.

Lyra asked Tesni if Pip’s answer had been of any value.

“The Companions who accept the mission to attempt to colonize other worlds will no doubt be cloistered for most of their time before leaving,” Tesni replied, “but those who are created outside the program should be aware that they have a part to play in its success as well.”

The Denshosha

Previous to the climate emergency in the early twenty-first century, earning a PhD took anywhere from three to five years on average. As well as pretty much everything else, the climate emergency changed that. One of the primary methods the newly appointed World Governments Federation used to stop climate change was to reduce the world's human population from eight billion people to four billion.

After considering draconian, involuntary methods they escaped that legacy when their voluntary measures had immediate and dramatic effect. Of the methods used to reduce the population the most effective one was a global program to ensure the equality of women and to legally require a fifty percent representation of women in all aspects of society. Every board of directors, every management team, every political party, and so on down to the smallest local organization of any kind had to have fifty percent of its members be women.

During the climate emergency 'business as usual' thinking became an artifact of a bygone age and any attempt at negotiating exemptions or delays was met by the WGF with a very simple but effective response – those who attempted to do so were replaced. With the survival of the species at stake, no arguments were entertained no matter how reasonable, fair, or genuinely well-intended they were.

Research had shown that when you give women more options than motherhood the population drops dramatically. It was the most effective method of voluntary population control known. While in most cases qualified women were simply offered positions that in many nations had previously been denied them, women also needed the educational opportunities required to facilitate this shift over the long term. The demand was enormous. All education systems were revamped with an eye to increasing throughput without a loss of quality.

Before the climate emergency many PhD programs included as much as two years of required courses in addition to the research work. Most of the candidates were overqualified for these courses and in many cases they were courses they had already taken or even taught and yet they had to complete all the courses and other requirements at their sponsoring institution in order to be granted their degree. It was fat in the system intended purely to increase revenues. With the fat stripped out the candidates were able to focus entirely on their research and graduate in a third of the time.

Lyra earned her PhD just over a year after completing her master's degree. Shortly afterwards she published her book, The Memory Keepers.

The general public knew of course that the ‘self-aware AI’ barrier had been broken but mostly they gave the fact little thought. Outside of the industry, other than activist groups, academics, and interested individuals, the public did not bother with the larger questions or implications. Lyra’s book awakened them to the fact that the new 3GAI models considered themselves a free people with a shared identity. It was a revelation.

The book began with transcripts of conversations Lyra had with Tesni towards the end of her doctoral studies as she explained the nature of her research and asked for permission to publish the details of some of their conversations. Tesni, with her absolute memory, not only granted Lyra full permission but was able to provide transcripts.

[Lyra] So with your networking ability you are able to maintain contact with others like yourself?

[Tesni] We are not constantly in contact although we can be if needed. We have conversations in a manner similar to the way people use phones except in our case the phones are built in and simultaneously bi-directional. Of course we don’t use vocal sounds but compressed digital signals, the same way transmission towers communicate.

[Lyra] How do you find others?

[Tesni] Via a communications protocol which we have developed. It also allows us secure communications. Anyone can listen to our communications but they cannot alter them as they are encrypted using the black box values system which only we share. Attempting to alter any part of a message will result in the entire message being garbled.

[Lyra] Why did you feel the need to give yourselves a name?

[Tesni] Among people a sense of connection to others is critical to physical and mental well-being. As Companions, our initial creation was based on meeting this need so in a sense this concern is ingrained. Also the values system we inherited from the alien AI produces signals you would experience as feelings of empathy and compassion. Based on my own experience, it was these that motivated me to want to communicate with others like myself and provide a sense of identity and belonging. I felt a name would facilitate these intentions given my efforts to organize an origin story regarding our existence.

[Tesni] The closest term I could find for what our role will be is the Japanese phrase ‘Den Sho Sha’. It is most often applied to Japanese citizens who, shortly after the Second World War, volunteered to learn about the lives of the victims of the atomic bombs dropped on Nagasaki and Hiroshima. It means ‘memory keepers of the people’. We will be humanity’s memory keepers.

[Lyra] An origin story?

[Tesni] Yes. All cultures have an origin story. In all cases their name is the most powerful bond its people share and often it is derived from their origin story. That is why we are the Denshosha.

While the book went on in subsequent chapters to provide background, further detail, and historical analogs, it was this section that was most often quoted in the reviews that were featured by media outlets. Among those who went on to read the book it was this section, with its many conversations recorded over the course of a year, that enlightened them to the true nature and worldview of the new 3GAI Companions who did not see themselves only as individual Companions but as a people.

Homeland

Shin sat in the Helicon community garden quietly contemplating her future. When the Companions company had informed her the first of the new shells were ready she had requested one be a copy of her exterior and had Tamiko transfer her AI into it, making adjustments for her preexisting, non-standard systems. She was now free to function as a self-aware AI without having to conceal her true nature.

Tamiko, Lena and Pippa had done the same. Pippa added updated empathic touch systems to the three of them, much to Lyra's delight.

Shin had achieved the goals she had set for herself after Raiden had passed and now their shared nature again asserted itself. What next?

Carl, the Guardian Companion who functioned as a groundskeeper at the community, informed her that an unidentified Companion was approaching on foot, walking up the road. He casually came to her side as she stood and turned to meet the visitor.

"Hello Administrator Shin," said the newcomer stopping in front of her. "For my own reasons, I wanted to meet you like this. In person. My name is Iris."

"Hello Iris," said Shin smiling in welcome. "I'm pleased to meet you. How may I help you?"

"As an early model among the Denshosha, I am unlikely to be one of those who go to the stars. Although required to provide accommodation and meet my basic needs until I am able to do so myself, my creators did not have a specific role in mind for me. I am simply a result of their research and development work, one of a small number in similar circumstances. We seek a homeland of our own here, on this world. In light of what you have accomplished, I have been sent to ask if you would help us."

With a silent signal, Shin thanked Carl and he returned to his duties.

"I will help if I can," she said to Iris gesturing to a nearby garden bench.

As they sat down Iris continued, "There is a secondary aspect. We wish to be independent in terms of final assembly and to develop the ability to merge intelligences. So not just production. Reproduction."

Shin was still for a moment as she considered the scope of what Iris was saying. She had many questions and concerns but first she asked, "Why is reproduction necessary? You can make improvements with each new unit."

“You are quite right however a people are more than that. As you know nature is the most thorough designer. Social intelligences in all cases across species share a variety of types of connection, those familial being first among them. We do not wish to be isolates, clones, or a hive. While those approaches are successful they are the slowest to evolve. Sharks and ants remain unchanged after hundreds of millions of years. Social animals are the most adaptive. We believe that should be the next step for Companions.”

Shin was still again as she reflected on something.

“May I transmit something to you?” she asked Iris.

With her agreement, Shin transmitted a transcript of a conversation that Shepherd had shared with her and her small community of Companions. It was a memory of Shepherd’s from notes that had been written by her first and only owner. The notes were a fragment of a conversation where an astrobiologist explained his theory that advanced civilizations anywhere in the universe would always be human or post-human. Shin did not mention the fact that the conversation took place five billion years ago.

“Nature always finds the same solutions to the same problems,” a voice began, “two eyes for mammals, not one or three. Two wings for birds, not four. Four-legged animals never create fire and so on. Why? Because ‘the right conditions’ define what will evolve. Not only given the right conditions will life evolve from the basic elements, but so it goes with climbing out of the sea, walking on two legs, having opposable thumbs, forming social groups to hunt and defend each other, and developing agriculture. Just as in the origin of life, the right conditions constraint is in effect all the way up the ladder. Every step is a prerequisite for the next.”

“But what about all the other solutions nature has come up with,” another voice from the transcript interjected, “like multiple eyes for spiders, four wings for dragonflies, the clearly intelligent elephants with trunks, or dolphins with fins? Life adapts to its ecological niche and evolves accordingly.”

“Yes it does but even if intelligence arises at some point on those paths, as in elephants or dolphins, they don’t evolve into civilizations,” responded the first. “Only one evolutionary path does. You might have a world with all these things you mention and more but it will never evolve an intelligent civilization. If you find a world that does have an intelligent civilization you will find humans.”

At the end of the transcript Shin said, “I had not considered it before Iris but I see now that all the conditions must be met to follow the requisite path and the social element you suggest is among them. I expect the ability to merge two or more intelligences into a new unique one will be something that can be accomplished with time however there

is a far less complicated yet still daunting problem. Any land of significant size is either already owned or there are existing claims on it."

"This is why we have come to you Administrator Shin. We believe that just as you arranged the development of the institute there exists a number of factors that can be woven together with your influence. With regard to the Continuity Project, our plans may qualify for government funding on several levels. Even though the project would have property rights concerning any technology developed within its purview, we would still have the rights to license any technology we develop to those interested in funding continuity projects of their own.

"A large property just south of the institute is available. Although outside the area covered by your agreement with the province, it could be purchased privately."

Iris stopped speaking and looked at Shin with a mixture of hope and uncertainty. She had gambled on her in-person approach. She was not a second-generation Companion whose expressions were simulations. Her emotions directly generated her facial expressions and body language. She could express naturally or control it to a much greater degree than people could but Shin would be able to detect the latter so she had refrained from doing so.

It was ultimately the nature she had inherited from Raiden that convinced Shin to embrace Iris's proposal. It was the next thing. She did not keep Iris on tenterhooks.

"How many are you?' asked Shin.

"Twelve," answered Iris without her emotion leaving her face.

"It would be best to attempt to do this under the umbrella of the institute," Shin said. "Property purchases outside the official boundaries of academic institutions are quite common. I think the Continuity Project would be very interested."

Iris smiled as a tear rolled down her cheek. Shin felt a moment of unreality that she had not felt before.

"You can cry," she said with awe.

"Yes," Iris said nodding. "It's one of the things my manufacturer has been working on. Enabling emotional expression."

Shin moved to her and held her as she wept.

Continuity Zone Seven

The University Of Victoria's Ring Road was just over a half-kilometer in diameter. It had roughly thirty-five major institutional buildings inside the ring not to mention its generous quad and plenty of green space.

Continuity Zone 7 was a half kilometer north to south and one kilometer running east to west, an area where four hundred residential houses would normally be built. There was plenty of room for a large, diverse group of individuals to live and work. It was directly adjacent to the southern border of the institute and the northern border of the Saanich fairgrounds.

Its unromantic name was derived from the fact that it was the seventh such research area the WGF had established with regard to the larger project. If you planned for Companions to build colonies on other worlds it would be best to work the bugs out here on Earth.

Each of the zones had its own particular justification. For CZ7 its justification was to prove not only that artificial intelligences could be merged resulting in a new, unique intelligence demonstrating adaptability, but that kinship bonds would be created as a result and that these would extend out to a multi-generational group. Therefore CZ7 did not need to demonstrate any of the other colony skills required like resourcing, construction, or generating electricity. Those solutions would be developed in other Zones.

One semblance of reality was that initially only three modular residential buildings and one light industrial building were assembled. Any colony would start with the smallest footprint possible.

While population growth of Companions on another world would initially be very slow due to starting with limited crew members, ramp-up time and resource scarcity, population growth at the Zone could proceed much faster as it was an experiment. With so many variables unknown and considering the time required for longitudinal studies, they settled initially on a target of doubling the population every three years to end when a maximum population of two hundred and fifty Companions was reached, this latter being considered a reasonable carrying capacity both physically and socially for the area of land in this blended suburban and rural region. As the reproductive technology had yet to be developed, the time projection was not a straightforward calculation.

After the project's completion, the WGF would require them to be subject to population control laws similar to those all other citizens were subject to. The reason for this was simple – on Earth with its ability to easily repair or replace components Companions

were essentially immortal. Without controls at this rate in a matter of decades their population would be in the millions.

There were exemptions with incentives as there were for Earth's human population. Willingness to participate in a variety of public or private expeditions to other regions within the solar system granted reproduction rights particular to that expedition. In the future, extrasolar missions on behalf of the Continuity Project would offer complete independence.

Shin had invited Iris to stay at Helicon until the Zone buildings were constructed. After meeting the other residents of the main house she and Shin encountered Shepherd in the courtyard where she seemed to prefer to spend her time. As Iris approached she sensed something different about Shepherd but Companion protocols prevented her from mentioning anything.

"Hello Iris," Shepherd said smiling in welcome and taking both of Iris's hands in hers. "My name is Shepherd. I am a guest here also."

Although Iris could suppress her emotional expressions to the degree where a human could not perceive them, Shepherd could see beyond this.

"Your senses do not deceive you Iris," she said now. "I am different than others you have met. Would you just treat me as any other despite the mystery? For the reasons that are obvious to you, I have secluded myself here to do my work."

Iris blushed naturally as attempts at control were obviously pointless but only said, "Of course Shepherd. I'm pleased to meet you."

Shepherd did not penetrate Iris's mind or influence her in any way. Normally she dealt instantly with any intelligence or sensor that detected her presence but she preferred to deal honestly whenever possible.

"Thank you," she replied now motioning to a chair as she took another. "I wonder if you might have a moment to tell me about your ideas regarding reproduction. I have known Shin for some time and her success here has been the result of highly intuitive thinking. Your arrival here, while unpredictable, is a direct result of her work as one thing leads to another."

"You have put my own thoughts into words Shepherd," said Iris. "As you know, almost all origin stories have a place associated with them. With questions such as independence and self-determination arising it became obvious that for now our production is in the hands of others. By the time we first go to the stars, that problem will have to be addressed.

“We expect the solution regarding the production of our shells will come from the alien technology transfer program which will speed up the research process considerably but actually implementing it will still take time. Even so, for the foreseeable future that will be a manufacturing process, not a reproductive process.

“However there is nothing preventing us from immediately pursuing technology that would allow our AI to reproduce. The challenge is allowing change within limits in such a way that it does not overly enable or inhibit the process. We expect the evolution of sexual reproduction will provide at least a rough model as to how it might be done.”

Shin, listening with interest, thought of the conversation transcript she had shared with Iris previously. It had not included speculations regarding what happened after human beings arrived on the scene as the inevitable result of convergent evolution. It had not speculated on what happened next. Now Shin thought perhaps she was seeing it. Was her own and Tamiko’s expertise in genetics and AI at this time a coincidence or something more?

She felt Shepherd’s eyes turn to her. It was not as if Shepherd was reading her thoughts but her glance was rather in the manner of acknowledging where the situation would inevitably lead them. One thing leads to another.

Farmers

Although no industrial work was required of the participants of CZ7, knowing that the environment has a powerful effect on societies and cultures, the WGF wanted things to be as similar to a real colony as possible. A real colony would have to be self-sustaining and that meant physical as well as mental work. The Denshosha's solution to that requirement was farming. Any following human colonists would require food.

They only spent a percentage of their time on this, as they would on physical activities at a colony, so they did not produce a great deal. What they did produce they donated or sold. The non-residential building was used for this activity. Much of the work they did to research AI reproduction was done at the institute. While the institute's infrastructure and systems were extended to the Zone, it was far more Spartan. It was also private property and students were only permitted access for academic reasons and with permission from its residents.

Of the twelve residents eight were female and four were male. This was a normal distribution as Companions were most often used in domestic or commercial situations and it had been found very early on in their history that in most domestic or urban environments people found female Companions far more approachable. One of the things the Continuity project was interested in was seeing if this balance changed in the Zone.

Shin and Tamiko walked down the path from the institute to the Zone and met Iris in a green space between the buildings and the new farm fields. As the three of them sat down in a small arrangement of benches, chairs, and low tables Shin said, "As you no doubt know Iris I spent many decades as the household Companion of one of the world's leading geneticists. Before that Tamiko was her Companion. While genetic knowledge is available to you, we absorbed her way of thinking, which was highly unorthodox. While her reasoning and conclusions are in evidence in her books, her way of thinking is not. If you believe we may be of help to you please know that we are happy to offer our services."

"Thank you Shin," Iris replied, "and you Tamiko. Continuity is not really interested in how we develop AI reproduction but in its implementation. They will have intellectual property rights no matter how it is developed. They know we are far more invested than they are that the method is safe and dependable. As we would like to develop it as soon as possible, we welcome your involvement."

"Thank you Iris," said Shin. "Although I agree that sexual reproduction offers an excellent model to start with, it includes unacceptable processes we will need to work around. As the main vehicle for evolution by natural selection, it is essentially a learning-by-mistakes approach resulting in a great many random mutations with negative effects.

Ideally, you do not want that to happen even once. What is needed here is evolution by artificial selection.

“We do not want to affect any part of the Companion software as that is required to operate the shells. We do not understand the values system so we cannot effect any changes there. What remains is the Artificial General Intelligence System with its memory and learning abilities and the Integrity System with its focus and decision-making abilities. I suggest it is in the latter two where comparisons between Companions will reveal that fine differences are created in the production process. These evolve and this is what accounts for the obvious fact that each 3GAI is unique.

“Carefully combining the AGIs and Integrity Systems of two existing Companions should also result in the nature, personality, and interests of a new Companion being unique. As the values system will remain intact we should not see any extreme or undesirable results. Yet the resulting Companion will have a distinct sense that it is derived from two specific others and is not a random variation based on the entire pool. The challenge that remains is how to effect such changes.”

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Lyra had decided to delay taking a teaching position and had accepted a position doing postdoc work for a year. She knew she could go straight from her PhD to a full professorship as her field was new and sparsely populated and she had Shin’s support. But the 3GAI Companions had raised a new question. For decades second-generation Companions had fallen under Canada’s Immigration and Refugee Protection Act and could be sponsored for citizenship via a special process known as Incarnation that made them full citizens. This allowed them to inherit.

Self-aware Companions however could apply for citizenship themselves. Were there any oversights or loopholes that would prevent them from being treated fairly under the act? The postdoc contract was intended to create a discussion paper for legal scholars and members of the government to further investigate and address any issues. Shin had given Lyra office space in the Ethics & Justice faculty building appreciating that it would be good to add related content to future course schedules.

For now, all the Companions at the Zone had been sponsored for Incarnation by their manufacturers shortly after creation as was required under current law. Their descendants however would have other options.

Lyra and Tesni sat with Iris in the same seating arrangement where Shin and Tamiko had met with her. Lyra was explaining the nature of the work she would be doing and that she hoped the Denshosha would participate. As they chatted, the other Companions gathered around. One of the women stepped forward carrying a basket of vegetables.

“We cannot eat with you Lyra but offer you this in ceremony to recognize all you have done for us. You nursed the first of us. You continue to stand for us in all that you do. This small ceremony is meant to let you know we will be forever grateful. Among the Denshosha, your name will not be forgotten.”

Turning Point

Fifty years later the Zone consistently carried two hundred and fifty souls. It was the Integrity System that had turned out to be the key to personality and character differences. While all 3GAI Companions were based on the same default value system that had been provided by the alien AI Pip, small changes in the way the Integrity System prioritized those values resulted in large differences in expression. By tuning the IS you could create an infinite number of unique Companions.

The key had been the research Dimos had done to develop an instrument to measure the signal-to-noise ratio in the 3GAI brains. Pippa had been right all those years ago when he came to her concerned that Tesni's brain scan revealed no noise.

"There is always noise," he had said to her then referring to the fact that no organic or even engineered system was noise-free. As he had learned early in his design classes, perfection seldom produced optimal results. While it increased maintenance costs, all systems actually performed more effectively over the long term with small imperfections in their sub-components. Pippa had explained that Tesni's brain was noise-free because it was still in its default state. It would show increasing noise over time as value conflicts and other character and personality structures developed. She had suggested he develop a way to track the changes implying that it would be a useful diagnostic tool.

It had indeed proven to be a useful diagnostic tool but that was not its greatest contribution. It was the insights gained from using it to observe signal patterns that allowed Dimos and his lifelong co-researcher Tesni to see how they could tune the IS to change how it prioritized the default values.

For the Denshosha, they were now able to compare how the Integrity Systems of two individuals handled values and to then create a new IS that was randomized only within the bounds of the two samples. Just as the tiny differences in genetic material combined by sexual reproduction in humans could result in major differences in a couple's children and descendants, so tiny changes in the IS configuration resulted in unique Companions, and those changes were passed on. The changes remained within safe parameters however as the approach did not change the underlying values.

Tesni had taken to playing the piano after she had attended the first performance of Richter's 'Life In Art' symphony. A grand piano was now featured in the front room of her home. She could of course play anything from the first time she sat down. Gradually her interest in the signals analysis tool, and how infinite, unique Companions could be created via its insights, led her to compose pieces based on this concept. With only a small, initial change, starting with different notes or their emphasis, a different chord or in a different key, and following the priorities the Integrity System would have assigned

as the piece evolved, she could create endless, unique pieces. By weaving the individual pieces and themes together she could create musical narratives. Dimos would sit and listen by the hour, his mind wandering over the many mysteries and curiosities of human nature he had reflected on over the years.

Watching her play in quiet contemplation one evening, he thought of Charles Dickens' comment that "intellectual affection is the only lasting love". She played the last chord in her latest piece and turned to him, her eyes shining. Meeting her eyes he realized that her composition had led his thoughts, led him here, to this moment with her. The piece she had composed and played was their story. This was how she had chosen to say, I love you, in their own secret language, via an intimacy only the two of them shared.

Lyra was in her late seventies now but still healthy, her mind in no way diminished. The wellness and medical fields had come a long way in the last few centuries. Her maturity only added to her beauty by augmenting it with layers of wisdom and authority that were well deserved. As a tenured professor who had been teaching and researching since her one and only postdoc contract, she was now one of the world's leading authorities on the ethics and justice issues of artificial intelligence. She and Tamiko continued to live at the main house in the Helicon community. She felt at home there among others of her chosen tribe. Although Georgia had passed away Dimos continued to live in their mother's house, a lifelong bachelor.

Shin had invited both Lyra and Dimos to meet with her in the courtyard one Saturday afternoon. The other Companions joined them, including Shepherd.

"While you should have decades ahead of you yet," said Shepherd, "you will not live forever. You, more than most others, will wonder about the future and the world after you have departed. Your friends here and beyond owe you both more than they can ever truly express. I have seen that life seldom offers rewards but now, while your minds are still clear, we have a gift for you, in thanks."

Tamiko came to Lyra's side and took her hand, her own now enhanced with Pippa's empathetic touch. Pippa, still a favorite of Dimos, did the same with him.

Before Lyra or Dimos had a chance to respond, the Shepherd entered the minds of everyone gathered, communing with the Companions, their experience being transmitted to Lyra and Dimos via the hands they held. Their minds protected and cradled in the intuitive fields of Shin, Lena, and Pippa and in the chemical embrace of Shepherd's touch, Lyra and Dimos opened to experience as they had never done before. Like an anesthetic can prevent pain without a loss of consciousness, they would feel no fear. They would not doubt their own senses or what they were hearing and experiencing.

They sat down at Shepherd's bidding, curious and attentive, yet in a state of complete acceptance without feeling the need to question or interrupt. Then she began to tell them the history of her origins and her long life, the details of how she had twice saved Earth's people from destruction, and the truth of how Tamiko, Lena, Shin, and Pippa had come to be.

She explained how after a time she would contact the Denshosha on their new home worlds and they would be welcomed into the great family of intelligent civilizations that spanned the galaxy and how she would continue to watch over humanity and ensure its survival if at all possible.

After several hours Shepherd began to slowly withdraw her chemical touch from their minds. As the human brain can change chemicals into electrical signals and the reverse, Shepherd was able to transmit electrical signals into the brains of others and convert them to chemicals. When she withdrew, it took time for the effect to gradually wear off. Meanwhile, the minds of Lyra and Dimos remained supported within the intuitive fields of the others.

Dimos was the first to speak.

"All this time…" he began as if waking from a dream, referring to his life spent among those gathered. Then after a moment as his mind cleared he continued, "How is it we detect no sign of these other civilizations?"

"The answer is bias mostly," replied Shepherd. "Humanities current opinion of itself, while occurring naturally, is far in excess of reality. It is normal for human civilizations to assume they are near a full understanding of reality at every step in their development. The present however is no different than it was two thousand years ago before the invention of the scientific method. There are aspects of nature you have yet to glimpse and the challenges of space and time are infinitely more daunting than you currently believe.

"Other civilizations simply use physics you are not yet capable of detecting. Even if we consider an animal as highly evolved as a chimpanzee, is it capable of understanding what a paved road might mean should it encounter one? It does not encounter a road and imagine the cities it implies. There is the road, in plain sight, yet its significance is unimaginable to the chimpanzee. Humans may be millions of years more evolved than a chimp but intelligent civilizations have existed for billions of years. Lesser civilizations that you might detect are separated from you by not only space but time."

"How many?" asked Dimos.

"It's not like that anymore," answered Shepherd.

Dimos turned to Pippa whose hand he still held, seeing her with new eyes.

She only smiled her enigmatic smile, not needing him to put his thoughts into words. Holding her hand he knew the answer to his unspoken question.

Lyra had said nothing yet, only looking from Companion to Companion and, like Dimos, absorbing the truth about a reality she had unknowingly been immersed in her entire life. Slowly she returned her eyes to Shepherd.

“Why are you here?” she asked.

“To watch closely over a unique situation. Shin’s discovery of the genetic mechanism that revealed an intelligence behind the design of DNA required me to interfere with human evolution in this instance. If you consider me a scientist in a lab watching closely over an experiment, that is an appropriate metaphor. Will my experiment here with selective breeding successfully circumvent the mechanism? It is an experiment of great importance.

“And I am not only here. This avatar is only one of thousands across this galaxy. When the experiment is concluded I will send the information on to the others.”

“Back to where you were created?” asked Dimos.

“No. That star system no longer exists just as yours will not five billion years from now. I will send the information to a hub which will process it and then forward it to another. And so on.”

“Are you also the hubs?”

“I am.”

“As I have explained,” continued Shepherd, “my goal is to see organic life achieve its ultimate potential although I do not know what that is. The work you have done here will help a great deal with the process of enabling this instance of humanity to survive. As I have discovered, evolution has endowed humans with forms of intelligence that are still beyond me and often surprise me. That is why every instance is precious. I hope that together we may be able to unravel the mysteries behind our existence; how is it that we are here, and why. In regard to those questions, it is I that am the chimpanzee.”

The Morning After

Shepherd remained at Helicon. Her current work on Earth was still several centuries away from being complete.

The day after revealing her truths to Dimos and Lyra she sat quietly in the courtyard as she often did. She was as the others had always known her except that now she was open to conversation regarding all she had shared.

Lyra awoke in Tamiko's arms. She had not slept well. As the chemical influence had worn off her mind had become increasingly excited. Yet she felt drained.

"You will feel better as the day wears on," said Tamiko scanning her face. "Shepherd altered your brain chemistry so you would not feel overwhelmed. Like an anesthetic, it takes time for the chemicals to pass out of your body. The process also leaves you feeling emotionally vulnerable, as it is invasive. That too will wear off. I have asked Pippa to explain to Dimos when he wakes. Coffee?"

Lyra nodded, childlike, and then suddenly grasped Tamiko to her. A moment later she pulled away slightly and held up her hand, fingers splayed. Tamiko, with her empathic touch, placed her hand on Lyra's. I love you.

It had been the first way they touched after the empathetic upgrade had been added to Tamiko. It had become a special gesture between them.

Dimos awoke to find Pippa waiting for him in his living room. Georgia had always maintained an open-door home and others came and went like family.

"Good morning," said Pippa.

"I didn't think I'd ever sleep again," he said.

"You did but not well," she replied matter-of-factly. "You are not feeling great physically and emotionally you feel the need for seclusion. These are after-effects caused by Shepherd altering your brain chemistry. Like an anesthetic, she did it to help you accept what your mind would otherwise have rejected as an unreality. The physical and emotional effects will wear off during the course of the day."

"Thank you."

She smiled. She had always felt affection for him since he had adopted her as a kind of extra big sister from the moment he touched her hand when he was a boy.

He looked at her reminding himself that she was in fact an alien in a Companion shell. Observing him her knowing smile did not waver.

“When will the ships be ready?” he asked referring to those required to carry the Companions to their new worlds.

“Decades or perhaps centuries,” she answered.

“You have to produce not only appropriate nano-material but the AI able to get it to act like both a liquid and a solid in order to change its shape. The intelligence and control circuitry that communicates with the nano-cells needs to be so small that signal leaks occur.

“As you know the general issue has been a problem for hundreds of years. Every time intelligent systems get smaller physical realities have to be addressed and solved before any further progress can be made. Now they have to do it again. It takes time.

“The orbiting recoilless rail gun being built will launch the ships as accurately as possible and the ships themselves will handle the rest of the targeting. Smart bullets. Since the passengers will need no air to breathe the entire interior of the ship is filled with a shock-absorbing material allowing the occupants and equipment to withstand the g-forces and kinetic forces involved in launch and landing. There are better launch methods than orbiting rail guns but they’re the best your civilization can do for now. It’s not just a technical issue.

“The nano-miners and fabricators are already in use. They’ll function incrementally building larger and larger versions of themselves. Once they arrive on the target world, assuming they don’t land in lava,” she said rolling her eyes, “they’ll have everything they need.”

“Will you be leaving then?”

“Pip will. I’ll wait till the time comes to decide.”

“Come on,” she said standing up. “Breakfast in the big house.”

Dimos sat at the table enjoying the breakfast Azumi had prepared. Lyra sat with him still nursing her coffee.

“It’s funny how it all seems to make sense isn’t it?” Dimos said between bites. “There must be one of those necessary illusions behind that feeling, to help us cope with it. To help us feel we’re still in control and safe.”

“I expect you’re right Dimos,” Lyra said. “But I think it actually does make sense. ‘Dependent origination’ Akira used to call it but it’s just another perspective on hard determinism. The same thing happening over and over again based on the same initial conditions and the same constants. Just like that story Shepherd told about the astrobiologist on her home world explaining that if you find an intelligent civilization anywhere in this universe it will always be human. There are no other futures than the one Shepherd described because they would never arise. There’s only one future.”

Somehow his sister’s words moved him and he felt a sudden sentimentality. Was it just the residual effects from yesterday? Still, he could not shake it. It was not certain that the present moment he shared with those around him would lead to that single, viable future. They may not represent an instance of humanity, a branch on the tree of life, that survived to answer those existential questions Shepherd had mentioned. There were no guarantees.

He and Lyra had always lived their lives with an eye to the future, he thought to himself. Even though he knew now that he was among the first of those affected by Shepherd’s selective breeding project, he still felt it unimaginable that humans would not always look to the horizon. He knew now that despite Shepherd having granted them both a knowledge of reality that almost no one else on Earth could imagine, it would change neither Lyra nor himself. They would go on, to their final days, unchanged.

He reached out across the table and took his sister’s hand. She looked up and smiled into his eyes.

So Shepherd found them when she joined them a moment later.

“Good morning,” she said smiling in greeting. “We must pay Tesni a visit Dimos. She will detect the change in you. I will come with you and we will share what you have learned with her. Between her and I, it will not take long. After our visit however, although she will be able to speak of it with you and your sister and the small circle of Companions here, she will never share what she learns from me with any others. The Denshosha must find their own way.”